OCTOBER, 1931 NUMBER 276

THE UNIVERSITY OF NORTH CAROLINA RECORD

RESEARCH IN PROGRESS

JULY, 1930-JULY, 1931

GRADUATE SCHOOL SERIES No. 24

THE UNIVERSITY OF NORTH CAROLINA PRESS
CHAPEL HILL, N. C.

Digitized by the Internet Archive
in 2014

http://archive.org/details/universityofnort276univ

FOREWORD

Research in Progress is the record and summary analysis of research activities of the Graduate Faculty and advanced students of the University of North Carolina during the year ending July 1, 1931. The present issue is the eleventh volume of this bulletin. Reports are included of appropriations from the Smith Research Fund and from the Rockefeller Fund for Research in Pure Science. In this volume, as in that of last year, publications of a general or a popular nature are listed by title only in Part II, pp. 106-109.

W. W. Pierson, Jr., *Dean.*

158150

APPROPRIATIONS GRANTED FROM THE SMITH RESEARCH FUND

PROJECT NO.	APPLICANT	SUBJECT	AMOUNT
151	MacNider, Wm. deB.	For traveling expenses to Washington for research work in the Surgeon General's Library, and to Philadelphia	$ 35.00
152	Leavitt, S. E.	For photostating MS of Claramonte's *De Aicala*	35.00
153	Shine, Hill	For traveling expenses to Washington to examine certain volumes of Brewster's *Edinburgh Encyclopaedia*	25.00
154	Wheeler, A. S.	To purchase one kilogram of cumidine to be used by a graduate student in an investigation	22.00
155	Carmichael, Kate J.	To secure photostats of Cibber's comedies for use in the preparation of an edition of these comedies	50.00
156	Hollingsworth, R. R.	For traveling expenses to Georgia in connection with doctor's dissertation, The Influence of Reconstruction on Education in Georgia	50.00
157	Harland, J. P.	To purchase a rare periodical and a book needed for studies leading to the production of a book on prehistoric Greece	35.00
158	Frazer, K. C.	For copying documents needed in preparation of biography of Senator J. T. Morgan	75.00
159	Lyons, J. C.	For a photostat copy of Du Ryer's *Aretaphile*	35.00
160	Stabler, L. B.	For a photostat copy of a French translation of Boethius' *De Consolatione*	25.00
161	Bond, R. P.	For photostat copies of eighteenth century poems	60.00
162	Hurley, L. B.	For traveling expenses to Washington for working on doctoral dissertation	35.00
163	Coffman, G. R.	To purchase the Henry Bradshaw Society Publications	110.00
164	Murchison, C. T.	For traveling expenses to New York in connection with work on business cycles	50.00
165	Shields, A. K.	For traveling expenses to Spain for work on doctoral dissertation	75.00
166	Carroll, J. E.	For traveling expenses to Paris to examine rare works in the Bibliotheque Nationale	50.00
167	Ericson, E. E.	To aid in traveling expenses in connection with the preparation of a bibliography of *Festschriften*	50.00
168	Boggs, R. S.	For traveling expenses in gathering folk-tales in Western North Carolina	75.00
169	McLeod, W. M.	For traveling expenses to France for securing and studying material on Richard de Fournival	50.00

APPROPRIATIONS FORM THE ROCKEFELLER FUND FOR RESEARCH IN PURE SCIENCE, 1930-1931.

APPLICANT	SUBJECT	AMOUNT
Prouty, W. F.	For study of Triassic basins in North Carolina, near Cumnock and Wadesboro and in the Dan River area, Rockingham County	$ 520.00
Couch, J. N.	Travel expenses in collecting *Septobasidium* to continue a monograph on that genus	200.00
Crockford, H. D.	For purchase of one Leeds and Northrup No. 2500 e type R galvanometer	60.00
	For repair of L. & N. type K potentiometer	110.00
Valentine, J. M.	For expanding and equipping a rat colony for experimental purposes	25.00
Hickerson, T. F.	One-half the cost ($800) of a Beggs deformeter, plus interest	425.20

PART I

RESEARCH IN PROGRESS

DEPARTMENT OF ANATOMY

W. C. George reports the following paper:

Some Significant Examples of Rhythm in Organisms. Presented before the Elisha Mitchell Scientific Society, April 14, 1931.

Numerous correlations are known to exist between various cosmic forces and cycles of metabolism in organisms. Examples were cited to illustrate the coincidence between metabolic rhythms and (a) the rotation of the earth on its axis, (b) the revolution of the earth in its orbit, (c) the revolution of the moon, and (d) sunspot cycles.

DEPARTMENT OF BOTANY

W. C. Coker has published:

The Bald Cypress. *Journal of the Elisha Mitchell Scientific Society,* XLVI: 86, pl. 7. 1930.

Reproduces a photograph of a cypress tree from Florida, which is supposed to be the largest tree east of the Mississippi.

Notes on Fungi, with a Description of a New Species of *Ditiola. Journal of the Elisha Mitchell Scientific Society,* XLVI: 117, pls. 8, 9. 1930.

A very distinct species of *Ditiola* on spruce from Colorado is given the name *Ditiola shopei. Lycogalopsis solmsii* is reported from Honduras, previously known only from Java. A photomicrograph by Adrian Couch of the peculiar wheel-like cross wall in *Allomyces* is published.

W. C. Coker and H. R. Totten are preparing a fully illustrated second edition of their Trees of North Carolina. (To be published by the University of North Carolina Press.)

H. R. Totten has ready for publication:

The botanical section of the fourth edition of the *Pharmaceutical Syllabus.* To be published in the winter of 1931 by the Pharmaceutical Syllabus Committee (J. G. Beard, chairman) representing the American Pharmaceutical Association, the American Conference of

Pharmaceutical Faculties, and the National Association of Boards of Pharmacy.

John N. Couch has published:

The Biological Relationship between *Septobasidium retiforme* (B. & C.) Pat. and *Aspidiotus osborni* New. and Ckll. *Quarterly Journal of Microscopical Science,* LXXIV: III: 383-437 pls. 15-19 and 60 text-figures. 1931.

Observations on Some Species of Water Molds Connecting *Achlya* and *Dictyuchus*. *Journal of Elisha Mitchell Scientific Society,* XLVI: 225-230 pl. 15. 1931.

Micromyces Zygogonii Dang., Parasitic on *Spirogyra*. *Journal of the Elisha Mitchell Scientific Society,* XLVI: 231-239 pls. 16-18. 1931.

The following master's thesis was accepted by the Department during the year:

A. C. Mathews. The Seed Development in *Pinus palustris* (Long Leaf Pine). (Under the direction of W. C. Coker.)

The structure and development of the pollen grain and seed are found to agree in general with that of other pines. The archegonial wall is found to have peculiar pits as described by Goroschankin, but his assumption that the pits are perforated is shown to be incorrect.

DEPARTMENT OF CHEMISTRY

J. M. Bell directed the following research:

Ethel M. Chapin. The Solubility of Oxalic Acid in Hydrochloric Acid Solutions.

The solubility of oxalic acid in water has been shown to decrease continuously with each addition of small amounts of hydrochloric acid at 0° C. and at 25° C. The further influence of hydrochloric acid has been explored at 0° C. and shows the same type of curve as those found by Herz and Neukirch at 25° C. and by Masson at 30° C. The three sets of values have been assembled as solubility ratios and all three show a minimum value close to one-third the solubility in pure water, but the location of the minimum on the ordinate is a function of temperature. On the abscissa the minimum in each case is at approximately 5.9 N. hydrochloric acid.

A comparison of vapor pressure for oxalic acid dihydrate and vapor pressures in nitric acid solutions shows seemingly conflicting facts, and points to a need for further study of the vapor pressures of the system.

A study is in progress of the solubility of oxalic acid in hydrochloric acid solutions at 50° and 80° C.

ALVIN S. WHEELER directed the following publications:

A. S. WHEELER and DAVID R. ERGLE. (From the doctoral dissertation of DAVID R. ERGLE.)

Naphthol Studies I. The Bromination of 1, 5-Dihydroxynaphthalene. *Journal of the American Chemical Society,* LII: 4872. 1930.

1, 5-Dihydroxynaphthalene (A) and 2 moles of bromine in glacial acetic acid at 80° gave 76 per cent of the *2, 6-dibromo derivative* (II), which does not melt at 300°; *diacetate,* straw yellow, m. 228°; *dibenzoate,* m. 262°; *dimethyl ether,* m. 161°; *diethyl ether,* m. 148°. Oxidation of II with CrO_3 in AcOH gave *2, 6-dibromo-5-hydroxy-1, 4-naphthoquinone* (III), rich red, m. 202°; *acetate,* golden yellow, m. 148°; the *pyroboroacetate* could not be isolated; nitric acid gave a yellow product, which explodes at 243° and contains N but no Br. Reduction of III with zinc in AcOH gave *2, 6-dibromo-1, 4, 5-trihydroxynaphthalene;* decomp. 157°; readily oxidized to III by ferric chloride. III and aniline gave the *2-anilino derivative,* m. 249°, needles of gun metallic luster, red by transmitted light. A (20g.) and 19.5 g. bromine in AcOH gave *2, 6, 8-tribromo derivative* (IV), m. 189° (decomp.); 70 per cent yield. Nitric acid gave a bromine-free compound, explodes at 249°; *diacetate,* yellow m. 174°; *dibenzoate,* m. 189°; *dimethyl ether,* m. 149°; *diethyl ether,* m. 125°, Oxidation of IV gave *2, 6, 8-tribromo-5-hydroxy-1, 4-naphthoquinone* (V), rich red, m. 196°; *mono-acetate,* golden brown, m. 234°. Acetate of A (10g.) and 14 cc. of bromine gave 19.5 g. *2, 4, 6, 8-tetrabromo-1, 5-dihydroxynaphthalene* (VI), which does not melt at 300°; 90 cc. boiling benzene dissolves 0.5 g.; it decomposes in solvents of higher boiling point; *dimethyl ether,* m. 226°; *dibenzoate,* m. 268°; oxidation with chromic acid gave V; nitric acid gave a bromine-free compound, chrome yellow, m. 232°. V and aniline in AcOH gave the *6, 8-dibromo-2-anilino derivative,* dark red, m. 206°; reduction of V with Zn and diluted sulphuric acid gave *2, 6, 8-tribromo-1, 4, 5-trihydroxynaphthalene,* flesh colored, decomp. 140°; *triacetate,* m. 185°; V yields a *pyroboroacetate,* hexagonal plates with a green metallic luster, does not melt at 300°. Acetate of A on bromination with 5 moles of Br gave a mixture of *2, 6-dibromo-5-acetoxy-1-naphthol,* m. 173°, and 13 g. of VI *2, 6-dibromo-5-acetoxy-1-benzoyloxynaphthalene,* m. 164°. These naphthoquinones are isomeric with certain halogenated juglones but not identical with any.

A. S. WHEELER and T. L. KING. (From the master's thesis of THOS. L. KING.)

Paracymene Studies XIV. 2-p-Cymylhydrazine. *Journal of the American Chemical Society,* LIII: 809. 1931.

The following new salts of cymylhydrazine were made: *acetate,* needles, m. 63°-64°; *lactate,* plates, m. 134.5°; *oxalate,* plates, m. 167°; *benzoate,* needles, m. 72°-75°. Lactate was found the only one stable toward water. A new condensation product: *m-nitrobenzaldehyde-p-cymylhydrazone-2,* rich red prisms (yellow by transmitted light), m. 143°, was found. Unstable products were obtained with other CO-containing compounds. These were reddish, viscous oils which did not solidify at -30°. Therefore, this hydrazine is limited in its application as a reagent for the CO group.

CRAWFORD REID MCLELLAN. (Master's thesis.) 6-Nitro-2-amino-p-cymene and Certain Derivatives.

6-Nitro-2-amino-p-cymene was prepared by the partial reduction of 2, 6-dinitro-p-cymene with ammonium sulphide. 2, 6-Dinitrocymene was prepared by nitration of p-cymene, and a new by-product noted. 6-Nitro-2-amino-p-cymene was characterized by its hydrochloride. The hydrazine of 6-nitro-2-amino-p-cymene was attempted but the results were negative. Seven new azo dyes were prepared by coupling the diazonium salt of 6-nitro-2-amino-p-cymene with aniline, p-nitraniline, p-toluidine, sulphanilic acid, 1-naphthylamine, 2-naphthylamine, and naphthionic acid. An unstable product was obtained with 0-toluidine and 6-nitro-2-amino-p-cymene. The dyes were applied to cotton, wool, and silk where possible, and tests were made for fastness to light, perspiration, washing, acids, and alkali. The reactions with sulphuric acid were recorded. The dyes gave various shades of yellow and red. The naphthionic acid dye was particularly beautiful on wool and silk.

ELIZABETH PHILLIPS STEVENS. (Master's thesis.) A Chemical Analysis of *Ipomoea Pandurata.*

This thesis contains a short discussion of pandurata from a botanical standpoint, and outlines the procedure followed in a chemical analysis of the root. *Ipomoea pandurata* belongs to the morning glory family and grows in sandy soil in the eastern part of the United States. It is principally interesting for its huge root, which may be used for medicinal purposes.

The root was prepared for analysis by slicing, drying, and grinding. The following was found to be its composition: water, 71.50 per cent; invert sugar, .36 per cent; sucrose, .29 per cent; starch, 10.10 per cent; cellulose and ash, 12.47 per cent; resins, 4.69 per cent.

Under the direction of PROFESSOR WHEELER the following research work is in progress:

W. J. MATTOX. (Progress on doctoral dissertation.) The Chlorination of 1, 5-Dihydroxynaphthalene.

In addition to the work described in the 1930 issue of this bulletin, the field of study has been extended and is now nearly complete. A full abstract will be reserved for 1932.

THOS. L. KING. (Progress on doctoral dissertation.) The Nitration of 2, 6-Dibromo-1, 5-Dihydroxynaphthalene.

The acetate of the compound named in the title was nitrated with concentrated nitric acid at 0° and a yellow crystalline compound was obtained. This contains three nitro groups, the bromine atoms remaining in the product. Upon treating benzene solutions of the product with aqueous solutions of the carbonates of sodium, potassium, and ammonium, highly colored salts are immediately precipitated. These may be recrystallized from hot water, forming splendid crystals of well-defined shapes. The reduction of the trinitro compound will be studied and also the nitration of the dibromo compound with acid of other concentrations.

J. N. LECONTE. (Progress on doctoral dissertation.) Pseudo-Cumidine Studies.

Pseudo-cumidine was acetylated and then nitrated, a nitro group entering position 6. This product should yield a hydrazine and many other derivatives.

A. P. SLEDD. (Progress on doctoral dissertation.) The Condensation of 2-Bromo-p-cymene with Aliphatic Bromides by the Fittig Reaction.

The condensation has been carried out with four bromides: n-propyl, n-butyl, iso-butyl, and iso-amyl bromides. The n-butyl product was converted into its sulphonic acid, the latter into its acid chloride, and this into its anilide.

S. C. CUBBAGE. (Progress on master's thesis.) A Comparative Study of the 3-Iodo- and 2-Iodo-p-cymenes.

The 2-iodo isomer is readily prepared from 2-amino-p-cymene by the diazotization process. It is far more difficult to prepare the 3-isomer. A very satisfactory method has not yet been found.

J. P. DOZIER. (Progress on master's thesis.) New Hydrazines in the Paracymene Series.

2-Amino-6-nitro-p-cymene was prepared, diazotized, and reduced with sodium sulphite, but no hydrazine was obtained. 2-Amino-5-bromo-p-cymene was diazotized and reduced with sodium sulphite with negative results. The reduction of the bromo compound was then tried with stannous chloride at 0° with immediate and very satisfactory results. Derivatives of this new hydrazine are now being studied.

FRANK K. CAMERON and H. D. CROCKFORD have continued to gather data on the aqueous systems containing ferric sulphate, sulphuric acid, and cupric sulphate.

Long-time contacts of liquid and solid phases are essential to obtaining true equilibria. Separation of liquid phases from residues of solid and mother

liquor have been unusually difficult because of high solubility, amorphous precipitates, and high content of water of crystallization. This difficulty has been met with an ultra-filter constructed by A. E. HUGHES.

FRANK K. CAMERON has directed the following research:

A. E. HUGHES. (Doctoral dissertation.) The Action of Aqueous Sulphur Dioxide on the Phosphates of Calcium. (This investigation was made possible by the Robert Ober Fellowship provided by G. Ober Sons and Company of Baltimore, Md.)

The vapor pressures have been determined for the systems: sulphur dioxide and water, and sulphur dioxide, water, and tri-calcium phosphate, between the temperatures 0°C. and 90°C. The results of previous investigators are confirmed; but the range of observations has been much extended.

Tri-calcium phosphate and phosphate rock, when treated with saturated aqueous solution of sulphur dioxide, at 25° C. to 100° C. at pressures from 3 to 10 atmospheres, are completely taken into solution. The phosphoric acid (P_2O_5) goes into solution more rapidly; but, on the establishment of equilibrium, it has been found that calcium oxide (CaO) is present in excess of the phosphoric acid (P_2O_5). All the phosphoric acid can be made available by such treatment.

Direct measurements of the volume of sulphur dioxide absorbed by tri-calcium phosphate have been made over a wide range of temperatures and at several pressures. This method of dry treatment has been applied to phosphate rock up to 1100°C. The reactions involved are very complex, and much sulphur dioxide is decomposed. The maximum phosphoric acid rendered available is about two-thirds of the total present.

No procedure utilizing sulphur dioxide promises better economy than the standard methods of treating phosphates with sulphuric acid.

T. W. RICHMOND. (Master's thesis.) Removal of Small Quantities of Iron from Aqueous Sulphate Solutions.

An investigation has been made of the possibility of removing small amounts of iron as a contamination in solutions of alum and the sulphates of sodium and magnesium. Commercial charcoals showed good adsorption of iron but coincident adsorption of too much of the other bases to prove efficient. Clays were, in general, poor adsorbers of the iron. An artificial permutite of the glauconite type proved highly effective, but by base exchange and not by adsorption, as shown by testing the results with the Freundlich equation.

With N. W. DOCKERY, PROFESSOR CAMERON has begun:

An investigation of the possibility of growing cotton commercially as a source of alpha cellulose. Cotton grown in the usual way has been analyzed at weekly intervals. Several varieties of cotton grown in different ways are

now under investigation, the work being made possible by a grant from the American Cotton Coöperative Association and supplemented by field observations of the Florence station of the South Carolina Experiment Station and individual planters.

With M. WOLFE, he has under way:

An investigation of the use of waxes, paraffins, lacquers, etc., for the preservation of manuscripts and similar materials, which has shown advantages for each, counter-balanced by objectionable features in each case. A systematic investigation of suitable media is under way.

J. T. DOBBINS has published:

J. T. DOBBINS and W. M. MEBANE. (From the doctoral dissertation of W. M. MEBANE.) A Study of the Quantitative Precipitation of Calcium Oxalate in the Presence of the Phosphate Ion. *Journal of the American Chemical Society,* LII: 1469. 1930.

Abstract in *Research in Progress,* 1928-1929, p. 16.

J. T. DOBBINS and W. M. MEBANE. (From the doctoral dissertation of W. M. MEBANE.) A Study of the Quantitative Precipitation of Calcium Oxalate in the Presence of the Arsenate Ion. *Journal of the American Chemical Society,* LII: 4285. 1930.

Abstract in *Research in Progress,* 1928-1929, p. 16.

J. T. DOBBINS has directed the following research:

RALPH M. BYRD. (Doctoral dissertation.) A Study of the Soda-Alum System and a Volumetric Method of Determining Sodium.

A study of the soda-alum system has been made. The isotherm for 25° C., which has been obtained for the system: sodium sulphate—aluminum sulphate—water, shows two transition points, one occurring between hydrated aluminum sulphate and soda-alum, the other between soda-alum and hydrated sodium sulphate. The composition of the solid in contact with the solution represented by the soda-alum curve corresponds to formula $Na_2SO_4.Al_2(SO_4)_3.24H_2O$. Therefore, soda-alum may be prepared at 25° C. by taking concentrations of aluminum sulphate and sodium sulphate which lie between the limits of these two transition points.

Soda-alum effloresces quite readily at room temperature when exposed to the air.

A new volumetric method for determining sodium has been developed in which the sodium is precipitated from a concentrated solution as sodium zinc uranyl acetate by means of zinc uranyl acetate. The precipitate is filtered through a Gooch crucible, washed with alcohol, dissolved in distilled water, and titrated with standard sodium hydroxide, using phenolphthalein as indi-

cator. Results of an accuracy of one part in a thousand were obtained.

Such commonly occurring elements as potassium, iron, calcium, aluminum, etc., do not interfere with this method, and it is applicable in all cases where gravimetric methods are effective.

HARVEY A. LJUNG. (Doctoral dissertation.) A System of Qualitative Analysis for the Anions.

A systematic scheme of analysis for the separation and identification of the anions has been developed. This scheme uses as its basis the theories concerning the mechanism of amphoterism and oxidation and reduction reactions, which stress the influence of the hydrogen ion concentration on reactions of this type. By controlling the hydrogen ion concentration of the containing solutions, the interferences commonly met in the anion analysis have been eliminated to a very great extent, thus making it possible to separate and identify practically all of the common anions without undue interference. In a few cases interference has not been completely overcome.

The anions have been divided into groups according to their behavior with certain metallic ions.

Group I.—To this group belong the following ions: carbonate, fluoride, oxalate, sulphite, arsenate, arsenite, phosphate, and tartrate. These ions are precipitated as the calcium salts from alkaline solution.

Group II.—To this group belong the following ions: sulphate and chromate. These ions are precipitated as the barium salts from alkaline solution.

Group III.—To this group belong the following ions: cyanide, borate, ferricyanide, sulphide, and ferrocyanide. These ions are precipitated as the zinc salts from alkaline solution.

Group IV.—To this group belong the following ions: thiosulphate, thiocyanate, iodide, bromide, and chloride. These ions are precipitated as the silver salts in solutions slightly acid with respect to nitric acid, with the exception of the thiosulphate, which is transformed into silver sulphide.

Group V.—To this group belong the following ions: chlorate, nitrite, and acetate. These ions are not precipitated but are identified in the filtrate from Group IV.

Group VI.—To this group belongs the nitrate ion. Nitrate is identified in some of the original solution.

The applicability of this scheme has been shown by numerous test analyses and by the determination of the sensitivity of the test for each ion, both alone and in the presence of large amounts of other ions.

JEPTHA P. SANDERS. (Doctoral dissertation.) A Study of the System: Lithium Sulphate-Aluminum Sulphate-Water, and a Quantitative Method for the Determination of Sulphates of Aluminum and Lithium.

The system: lithium sulphate-aluminum sulphate-water has been studied at zero degrees. The solubility of each salt decreases with the increase in the

concentration of the other. Change of temperature does not have very much effect on the solubility of lithium sulphate in the presence of aluminum sulphate, but lowering the temperature decreases the solubility of aluminum sulphate in the presence of lithium sulphate. Increase in temperature displaces the transition point in the direction of higher concentration of aluminum sulphate and lower concentration of lithium sulphate. The transition point was determined at 50 degrees for the system. An alum was not found to exist at zero degrees.

A method has been worked out for the determination of sulphates volumetrically. Sulphates may be determined more rapidly by this method than by the gravimetric method with an attainable precision as high as that in the gravimetric method.

Determination of aluminum and formation of lithium aluminate. Lithium aluminate of the formula $2Li_2O.5Al_2O_3$ has been prepared. Aluminum may be determined quantitatively as lithium aluminate, and more concordant results are obtained by this method than by the ammonium hydroxide method.

E. S. GILREATH. (Progress on doctoral dissertation.) Solubility of Calcium Phosphates in Phosphoric Acid.

The solubility of calcium phosphate in solutions of phosphoric acid has been determined at 80°. At this temperature dicalcium phosphate is stable in contact with solutions up to 36 per cent phosphoric acid. Above this concentration the dihydrate of mono-calcium phosphate is the stable phase to a concentration of 49 per cent phosphoric acid. Above this concentration the anhydrous mono-calcium phosphate is the stable phase.

E. W. CONSTABLE. (Progress on doctoral dissertation.) A Study of the Composition and Toxicity of Paris Green.

F. H. EDMISTER has published:

(With D. A. MCPHERSON and H. V. HARSHMAN.) The Determination of Small Amounts of H_2S. *Journal of the Elisha Mitchell Scientific Society,* XLVI: 54. 1930.

F. H. EDMISTER has directed the following research:

GEORGE GRADY ALBRITTON. (Doctoral dissertation.) A Comparison of the Behavior of the Tartrate and Oxalate Solutions of Columbium and Tantalum Oxides.

An oxalate solution of columbium and tantalum oxides did not show evidence of a reaction when treated with benzoic, citric, phthalic, salicylic, succinic, picric, formic, and acetic acids. The mineral acids precipitated white amorphous columbic and tantalic acids. Attempts to prepare double oxalates

with the heavy metals were unsuccessful. The tartrate solutions were found to be stable towards ammonia and the alkalies; the mineral acids precipitated columbic and tantalic acids. Acetone precipitated the metals quantitatively in a very distinct crystalline form. Various organic acids showed no reaction. Attempts to prepare complex tartrates with the heavy metals were made. Only barium and cobalt seemed promising.

The solvent action of tartaric acid on the oxides of the metals did not involve a double decomposition comparable to the action of acids on basic oxides when primary salts are formed. Ion migration tests showed that the metals migrate as anions. This migration phenomenon can be explained by assuming that either the oxides are peptized by the tartrate ion—hence the migration is a case of cataphoresis—or the metal is tied up in the tartrate ion, forming a complex anion. Evidence favored the latter assumption. Although columbium formed the more stable complex, a quantitative separation of tantalum from columbium was not realized.

PROFESSOR EDMISTER has the following research in progress:

The Solubility of Calcium Sulphate in Aluminum Sulphate Solution.

H. D. CROCKFORD has published following papers:

H. D. CROCKFORD and MAUDE WEBSTER. The System: $CuSO_4$-Li_2SO_4-H_2O. *Journal of Physical Chemistry,* XXXIV: 10: 2375. 1930.

H. D. CROCKFORD and A. E. HUGHES. (From the master's thesis of A. E. HUGHES.) Binary Systems of Certain Nitrotoluenes with Benzoic Acid. *Journal of Physical Chemistry,* XXXIV: 9: 2117. 1930.

H. D. CROCKFORD and A. E. HUGHES. The Photographing of Cooling Curves. *Journal of Physical Chemistry,* XXXIV: 11: 2624. 1930.

PROFESSOR CROCKFORD has been engaged during the year on the following projects:

(With F. K. CAMERON.) The System: Ferric Sulphate-Sulphuric Acid-Water. (See pp. 10-11.)

(With H. C. THOMAS.) The System: Magnesium Sulphate-Copper Sulphate-Water.

A study of the equilibrium conditions in this system is being undertaken at 0° C. and 25° C.

(With R. H. MUNCH.) The Vapor Pressure of some Organic Sulphides.

A method has been developed for determining with a high degree of accuracy the vapor pressure of small amounts of organic sulphur compounds. Actual measurements are now under way.

RALPH W. BOST has published:

(With P. BORGSTROM and D. F. BROWN.) *Bibliography of Organic Sulphur Compounds.* Baltimore: The Lord Baltimore Press. 1930. 187 pp.

A classification of the organic sulphur compounds appearing in the literature from 1871 to 1929, including a brief abstract of each reference. These compounds are divided into thirty-four groups with cross references, and constitute Section I. In Section II, all the U. S. patents pertaining to sulphur compounds are listed with a brief abstract of each patent.

R. W. BOST and M. W. CONN. (From the master's thesis of M. W. CONN.) The Behavior of Certain Thiophanes in Heptane and Naphtha Solutions. *Journal of Industrial and Engineering Chemistry,* XXIII: 93. 1931.

Abstract in *Research in Progress,* 1929-1930, p. 19.

R. W. BOST and W. W. WILLIAMS. (From the master's thesis of W. W. WILLIAMS.) Carbithioic Acid Studies. II. Cyclohexylcarbithioic Acid and Various Derivatives. *Journal of the American Chemical Society,* LII: 4991. 1930.

Abstract in *Research in Progress,* 1929-1930, p. 19.

R. W. BOST and W. F. SMITH. (From the master's thesis of W. F. SMITH.) 4-Para-tolythiosemicarbazide and its Reactions with Ketones. *Journal of the American Chemical Society,* LIII: 652. 1931.

Abstract in *Research in Progress,* 1929-1930, p. 19.

PROFESSOR BOST has directed the following research:

H. R. BAKER. (Master's thesis.) The Synthesis and Reactions of Tin Tetra-p-tolyl.

Tin tetra-p-tolyl was prepared by a modification of Pfeffer's method. In this study it was shown that tin tetra-p-tolyl reacts strongly toward entering substituents, that no ortho-isomers were formed, and that it could be used very effectively as a tolylating reagent. It reacts vigorously with the halogens to form excellent yields of the parahalides of toluene. Negative results were obtained in the case of alkyl halides. Acyl halides gave low yields of the corresponding p-tolyl ketones. Sulphur at various temperatures and con-

centrations gave varying yields of di-p-tolyl disulphide and 3, 7-dimethylthianthrene. Nitric acid gave excellent yields of p-nitrotoluene. Sulphuric acid gave a 94 per cent yield of toluene.

R. H. BELCHER. (Master's thesis.) The Preparation and Properties of Certain Mixed Sulphides.

Methyl-phenyl, ethyl-phenyl, n-propyl-phenyl, iso-propyl-phenyl, n-butyl-phenyl, and n-amyl-phenyl sulphides were prepared in good yields by the action of alkyl halides on sodium thiophenolate. A study was made of their reactions with the following reagents: mercuric chloride, methyl iodide, potassium permanganate, hydrogen peroxide, and bromine. These sulphides resemble the aryl sulphides in their reactions with these reagents.

M. W. CONN. (Progress on doctoral dissertation.) The Synthesis and Behavior of Certain Thiophanes in Hydrocarbon Solution.

Trimethylene sulphide was prepared by the action of alcoholic sodium sulphide on trimethylene bromide. Alpha methyl tetramethylene dibromide and alpha methyl pentamethylene dibromide were obtained by the aceto acetic ester synthesis. The latter dihalide was converted into the corresponding thiophane by means of alcoholic sodium sulphide. Trimethylene sulphide has been studied in hydrocarbon solution with the following reagents: mercuric chloride, nitric acid, potassium permanganate, 30 per cent hydrogen peroxide in glacial acetic acid, bromine, and methyl iodide. The synthesis of the thiophanes is accompanied by side reactions in which polymers are formed. These have been studied.

G. C. HOLROYD. (Progress on doctoral dissertation.) The Synthesis and Behavior of Heterocyclic Organic Compounds in Heptane Solution.

Alpha thienyl mercaptan was obtained by the action of sulphur on 2-iodo-thiophene. The following thienyl thio-ethers were obtained from alpha thienyl sodium mercaptide by means of the Williamson synthesis: methyl, ethyl, and propyl thienyl thio-ethers. These compounds could not be prepared by the action of the alkyl mercaptide on 2-iodo-thiophene, even under pressure. The sulphur atom in the ring exerts a strong influence on the sulphur in the side chain, as shown by the inertness of the latter toward inorganic salts, halogens, alkyl iodides, and reactions with oxidizing agents. These compounds resemble thiophene in that they give a positive indophenin reaction.

W. F. SMITH. (Progress on doctoral dissertation.) Tertiary Thio-ethers.

Doubts has been expressed by certain investigations as to the existence of ter-thio-ethers. This work was undertaken to determine the correctness of this viewpoint. Ter-butyl and ter-amyl thio-ethers were prepared and their stabilities toward air, light, heat, and chemical reagents studied. The hydrogen

ion concentration of the reaction medium and the temperature employed are vital factors in the formation and purification of these compounds.

J. O. TURNER. (Progress on master's thesis.) A Study of p-Phenyl Phenacyl Bromide and its Reaction with Mercaptans.

P-phenyl phenacyl bromide was prepared by the action of bromine on biphenyl methyl ketone in glacial acetic acid. It forms solid derivatives with the sodium mercaptides of the following mercaptans: ethyl, n-propyl, iso-propyl, n-butyl, iso-butyl, n-amyl, iso-amyl, heptyl, and phenyl ethyl mercaptans. Similar products were obtained with thiophenol, B-thio-napththol, and p-thio-cresol.

A. M. WHITE is directing the following research:

GEORGE HOENSHEL FLEMING, JR. The Elimination of Sulphur from North Carolina Coals.

The following additional master's theses were accepted during the year:

ROY FRANKLIN ABERNETHY. The Chemical Constitution of Shrimp Oil. (Under the direction of F. C. VILBRANDT.)

Prepared shrimp waste was extracted with ethyl ether and an oil was obtained. After the physical properties of the oil were determined it was separated into three fractions, the constants of which are given below.

Original Oil. $C_{56}H_{104}O_8$. Molecular weight 978. The oil was extracted with ethyl ether and was a dark red, viscous liquid, which showed green fluorescence by reflected light. It gave an iodine number of 52.2, and a saponification number of 116-130.

Cholesterol. $C_{27}H_{46}0$. Molecular weight 386. It is a white, crystalline substance melting at 146.5° C. after being recrystallized ten times, soluble in hot methyl and ethyl alcohol, ether, benzene, chloroform, and carbon tetrachloride. It gives color reactions with Liebermann's and Hagar-Salkowski tests. The preparation of the benzoate and acetate further identified the crystalline substance; melting points for the benzoate and acetate were 145 and 114° C.

Solid Residue. $C_{60}H_{110}0_{20}$. Molecular weight 1186. It decomposes before melting and gives a saponification number of 158-160. It is very inert substance, forming no derivatives and soluble only in chloroform.

Liquid Residue. $C_{66}H_{132}0_{11}$. Molecular weight 1113. This decomposes before boiling and gives a saponification number of 166-173 and an iodine number of 47.5.

From an examination of the formulas for the solid and liquid residues it appears that the solid residue is an oxidation product of the liquid residue.

EDWARD EARL HUFFMAN. Pressure Factor in Mercerization. (Under the direction of F. C. VILBRANDT.)

This investigation undertook to study the effects of the pressure factor in combination with such variable factors as temperature, time, and concentration of solution in the mercerization of cotton with sodium hydroxide.

Cotton yarns were treated in the form of skeins, loosely and under tension on forms, in sodium hydroxide concentrations of 30°, 50°, and 70° Tw. For each concentration runs were made under pressures of—14.3, normal, 15, 30, 60, 100 lbs. per sq. in., which were maintained in an autoclave. At each pressure, temperature, and strength of solution runs were made, varying the time of immersion 2, 5, and 10 minutes. At all concentrations of solution and at all different times of immersion the tensile strength of cotton tended to increase with an increase in pressure. It was most pronounced at medium and low temperatures. With an increase in pressure the extensibility, shrinkage, luster, and dye affinity were not affected.

JOHN BRUCE JOYNER. The Effect of Equipment Composition in Water Analysis. (Under the direction of F. C. VILBRANDT.)

The composition of the equipment used in this study included platinum, quartz, porcelain, sillimanite, and pyrex, the platinum serving as the standard for comparison. The analytical determinations were for total solids, silica, calcium, magnesium, sodium, potassium, and sulphates, all according to standard methods with the exception of the material composition of the equipment.

Variations in results obtained in this investigation were so slight in all cases as to be negligible. It is concluded that apparatus composition has no appreciable effect on the values of the different constituents determined in water analysis, provided there is no chemical reaction with the equipment resulting from the nature of the water that is analyzed.

Quartzware, sillimanite, pyrex, and porcelain are interchangeable with platinum for the determination of total solids, silica, calcium, magnesium, sodium, potassium, and sulphates when proper precautions are taken.

DEPARTMENT OF CLASSICS

GEORGE HOWE has published:

The Development of the Character of Aeneas. *The Classical Journal,* XXVI: 182-193. 1930.

This paper attempts to show that Vergil has presented a gradual growth in the character of Aeneas rather than merely a "conversion," as is more commonly thought. The several stages of the development are traced and interpreted.

G. A. HARRER has published:

(With M. H. GRIFFIN.) *Fasti Consulares. American Journal of Archaeology,* XXXIV: 3-7. 1930.

In this paper an attempt has been made to supplement, largely on the basis of new material in the field of Latin inscriptions, the work of W. Liebenam,

Fasti Consulares Imperii Romani. New information on the chronology of consuls already known, and newly discovered additions to the consular years for the first three centuries of the Empire are given.

Some Characteristics of Roman Lettering and Writing. *Studies in Philology,* XXVIII: 1-17. 1931.

The possible origin and the use of the serif and of shading in Roman lettering are discussed. It is suggested that in the forms of extant inscriptions, cut or painted, there may be found information about the book-hands of the Republic and the Early Empire. In this connection there is some study relating to rustic and square capitals, word-separation, word-divisions, paragraphing, and the lengths of columns and of lines of texts.

PROFESSOR HARRER has in preparation the following studies:

Tacitus' Account of the Trial of Cremutius Cordus.

The Copying of Military Diplomas.

A Recent Military Diploma Concerning Roman Syria.

J. PENROSE HARLAND has published:

The Shaft Graves and Tholos Tombs at Mykenai. *The American Journal of Archaeology,* XXXV: 62-63. 1931.

PROFESSOR HARLAND is preparing for publication the final report on the Excavations of the Prehistoric Site at Nemea, and is continuing the assembling of material for a work on the Helladic civilization.

The following doctoral dissertations were accepted by the Department during the year:

PHILIP MACON CHEEK. Vergil's Treatment of the Templum in the *Aeneid.* (Under the direction of GEORGE HOWE.)

The first phase of the study consists of a discussion of the poet's method of treating the sanctuary and comprises such elements as the purposes for which he uses it, the devices which he employs for introducing it into the narrative, and the principles which he follows of integrating the descriptions of the shrines with the moving action of the poem. The second phase constitutes a collection and analysis of the descriptive material employed in the various descriptions, with comments on their similarities and variations. The conclusions to be drawn from the first phase of the research may be summed up as consisting of the following elements: 1. the temple is employed for various purposes and with various aspects; 2. it is always introduced into the narrative in a natural way, with the result that its introduction never seems intrusive or detached; 3. the various treatments of it are always in their entirety, and usually in their details, integrated with the moving action of the poem. The

conclusions to be drawn from the second phase may be summed up as comprising the following: 1. there are two descriptive items invariably used in all individual treatments of the shrine, namely, the statement of the place of its location and the deity to whom it is consecrated; 2. there are two other elements used in the majority of the treatments, namely, the creation of an atmosphere and the suggestion of the closer environment of the edifice; 3. there are those items used in each case which serve to distinguish each individual temple.

EDGAR BRYAN JENKINS. Index of Terence. (Under the direction of GEORGE HOWE and G. A. HARRER.)

This index is a complete list of the words and enclitics in the plays of Terence. The basic text is the edition of Kauer and Lindsay (Oxford, 1926). Variants from the texts of Umfenbach (Berlin, 1870), Dziatzko (Berlin, 1884), Fleckeisen (Leipzig, 1897), and Tyrrell (Oxford, 1902) are added, but no manuscript variants as such are included. The vocabulary is listed in general according to the arrangement in *Harper's Latin Dictionary*. The index contains a total of 3,050 different words, 50,845 occurrences, and approximately 1,500 variants. A preface, list of abbreviations, and bibliography give information essential to its use.

The following master's theses were accepted by the Department during the year:

MARTHA BELL. Sketches of Individuals in the *Annals* and *Histories* of Tacitus. (Under the direction of G. A. HARRER.)

There appear in the *Annals* and *Histories* of Tacitus some fifty-eight sketches of individuals, which generally contain information about origin, character, and career. The contents of the sketches involve the same kinds of elements. Tacitus introduces these summaries at various occasions in the history of the individual's career. There are sketches of emperors, senators, equestrians, men of foreign birth, women. The great majority concern senators, men regularly important in the narrative. Tacitus estimates character with understanding of individual temperament, and displays his unusual ability for condensed and vivid expression. Sallust's sketches in the *Jugurtha* and *Catiline* were plainly his models.

BEVERLY TURPIN MOSS. The Structure of the Tenth Aeneid. (Under the direction of GEORGE HOWE.)

The Tenth Aeneid is found to have a definite scheme of composition. This consists of a series of battle scenes connected and inter-related by an introduction, a development, and a conclusion, which are worked out logically through devices of main plot, sub-plot, and pairings and interweavings of characters both in their qualities and in their rôles in the action.

FREDERICK BOYD NIMS. Vergil's Use of Objects of Art in the *Aeneid*. (Under the direction of GEORGE HOWE.)

The poet used objects of art in the *Aeneid* for technical purposes: to bridge a pause in the story, to portray more vividly the character and background of the hero, to stress human relationships, to give an Italian coloring to the poem, to develop Roman and Italian nationalism, and to add beauty and impressiveness to the story. In one instance an object of art serves as a forwarding motive in the action of the story.

MABEL ALLEN POWELL. The Followers of Aeneas. (Under the direction of GEORGE HOWE.)

This study undertakes to give a complete account of the roster of minor characters (exclusive of Aeneas, Anchises, and Ascanius) who were at any time members of the expedition that accompanied Aeneas from Troy to Latium. The names are arranged alphabetically, and all information on each is collected and studied. At the end a summary gives figures and classifications.

The following studies have been undertaken by candidates for advanced degrees:

LUCY E. AUSTIN. Characters in Cicero's Dialogues (for the doctor's degree).

LILLIAN DORN. Omens in Lucan's *Pharsalia* (for the master's degree).

VAN COURTLANDT ELLIOTT. Roman Senators in the Time of Hadrian and the Antonines (for the doctor's degree).

EDWINA FORD. The Women of the *Aeneid* (for the master's degree).

SARAH LETTICE FOSTER. Pliny the Younger's Reading in Greek and Latin Literature (for the doctor's degree).

LAURINE HAYNES. A Late Manuscript of Cicero's *De Officiis* (for the doctor's degree).

LOUISE HUNTER. Conventional Attitudes Toward Emperors in Post-Augustan Literature (for the master's degree).

VIRGINIA MARTIN. Certain Stylistic Features of Catullus (for the master's degree).

LESSIE BROWN PHILLIPS. Arrangement of Material in Livy's History (for the master's degree).

EUGENE R. SMITH. Sallust's Sketches of Personalities (for the master's degree).

MINNIE J. SMITH. Roman Attitude Toward Eastern Influence (for the doctor's degree).

EVELYN LEE WAY. Seneca's Influence on Later Historians of Rome (for the doctor's degree).

LILY MAE WERTZ. Comparison of Certain Features in the *Culex* and *Aeneid VI* (for the master's degree).

ELIZABETH WHITE. Seneca and Suetonius on the Reigns of Caligula and Claudius (for the master's degree).

DEPARTMENT OF ECONOMICS AND COMMERCE

DUDLEY D. CARROLL and DUANE MCCRACKEN (Professor of Economics in Guilford College) are collaborating in editing a collection of readings on Southern Industry. The evolution of economic conditions and their effect on attitudes and social institutions are the themes around which the material is being organized.

C. T. MURCHISON has published during the year:

King Cotton is Sick. Chapel Hill: University of North Carolina Press. 1930. Cloth, xi, 190 pp.

An analysis of the organization and business methods of the cotton goods division of the textile industry, with a view to ascertaining the causes of the depression which has been chronic in that division since 1925. A portrayal of the problems which afflict the textile industry both in New England and in the South is followed by a presentation of what appear to be appropriate remedies.

Management Problems in the Cotton Textile Industry. A chapter in *Management Problems.* (Edited by G. T. SCHWENNING.)

Southern Textile Manufacturing. *The Annals* of the American Academy of Political and Social Science, January, 1931.

ERICH W. ZIMMERMANN has published:

The Resource Hierarchy of Modern World Economy. *Weltwirtschaftliches Archiv,* XXXIII: 2: 431-463. 1931.

Modern world economy, still in the amorphous stage, is subject to radical changes, both structural and functional. These changes destroy the *a priori* comparability of the different branches of production as well as of commodities. Thus the premises on which the law of comparative costs rests lose some of their practical significance. A new basic pattern of conditions underlying world economy is, therefore, suggested as a substitute for the traditional pattern. The form of the new pattern is that of a hierarchy.

The mechanical revolution has created a new resource basis of civilization. This new basis is composed of inanimate energy (energy derived from the fossil fuels), inorganic substances (the metals), science, and capital. As an instrument of material production, this modern resource basis is intrinsically superior to the ancient basis made up of sunshine, rain, soil, muscular energy, and living organic substances. The nations of the world, which for geographical, racial, and historical reasons are in a position to build their economies on the new resource basis, are predestined to dominate the regions of the world condemned to continue their economic life on the ancient resource basis. World economy, therefore, has become a hierarchical structure. Surplus capital which holds sway over modern science occupies the Holy See: coal,

petroleum, and iron rank next with copper and other energy and machine resources. Agriculture, on the other hand—especially those branches occupied with the production of annual crops—dwells near the periphery, representing as it were the laity. The production of perennials, especially tropical plantation industries (rubber, coffee, camphor, quinine, etc.), occupies a middle ground. Agriculture tends to become more and more a mechanized appendage of capitalistic industry. Geographically, this hierarchical structure of world economy means rule by the countries bordering the North Atlantic; politically, it spells the domination of the Anglo-Saxon race. The duration of the present order is contingent on the prevailing arts—technological as well as social. Abuse of the power held by the privileged group will seal its doom.

E. E. PEACOCK has completed the following:

The Tax Burden on Manufacturing Industries in the State of North Carolina. *Report* of the Tax Commission of the State of North Carolina, 1931.

A Study of the Financial Problems of the Cities and Counties of the State of North Carolina. (Not yet published.)

MALCOLM D. TAYLOR has published during the year:

A Study of Prices in Chain and Independent Grocery Stores in Durham, North Carolina. *Harvard Business Review,* VIII: 4. July, 1930.

A Study of Weights in Chain and Independent Grocery Stores in Durham, North Carolina. *Harvard Business Review,* IX: 4: 443. 1931.

G. T. SCHWENNING has published during the year:

Management Problems (editor). Chapel Hill: University of North Carolina Press. 1930. Cloth, xiv, 266 pp.

A collection of addresses dealing with various aspects of management made before the University of North Carolina Student Section of the Taylor Society during 1929-1930.

The Management of Manpower. A chapter in *Management Problems.*

Corporate Finance and the Engineer. Read before the North Carolina Section of the American Society of Civil Engineers and published in the Society's Proceedings, *Technical Papers, No. 1.* 1930.

PROFESSOR SCHWENNING has contributed a chapter on Southern Industrialism and Labor to a book on the Technological Revolution and the

Labor Movement, which is edited by J. B. S. Hardman and is to be published by the University of Chicago Press.

He is now engaged in editing a book on Trends in Management to which he has contributed several chapters.

The book consists of lectures on significant developments in the field of management which were delivered during 1930-1931 before the University of North Carolina Student Section of the Taylor Society.

He is also completing a book on the Dismissal Wage.

The volume consists of (1) a discussion of the nature and extent of voluntary discharge wage payment plans in force in the United States and in Europe; (2) an analysis and summary of dismissal wage laws enacted in European countries, Latin-American countries, Japan, and in two states of the United States; and (3) an evaluation of the significance of this new development in labor relations.

C. P. SPRUILL, JR., is at work on a study of the finances of the State of North Carolina from 1860 to the present time.

WIRTH F. FERGER has published during the year:

The Nature and Use of the Harmonic Mean. *Journal of the American Statistical Association,* March, 1931.

The first of a series of articles in preparation concerning the method used in the construction of price index numbers.

He has the following research in progress:

Unused Capacity in Certain American Industries.

A statistical and analytical study of the losses in American manufacturing industries because of the idleness of equipment due to excess capacity, seasonal and cyclical part-time production, etc.

Elasticity of Demand as Related to Index Number Construction.

A theoretical discussion of the application of statistical studies of demand elasticity to the construction of current price index numbers.

The following doctoral dissertation was accepted during the year:

RALPH C. HON. Railway Efficiency Since 1920. (Under the direction of M. S. HEATH.)

A study of the improvement in American railway service since 1920. Attention is directed primarily to an analysis of the conditions which made possible the unusual development of railway operating efficiency since the return of the railroads to private management. The introductory chapter presents a brief background study. The problem of "public interest" in railway service

is described. The effects upon service of governmental regulation and of the actions of the railroads are indicated. Chapter two deals with methods of analysis. A preliminary investigation of the data and an appraisal of currently accepted methods of measuring the phenomena are made. The principal object is to develop a sound methodology. It is hoped that this section may also be useful to students of general business fluctuations as affording both a critical and positive analysis of widely used transportation indices. Chapters three to six, inclusive, comprise the analysis of the nature and relative importance of the various factors which have contributed to the remarkable increase in railway efficiency since 1920. The weights of the various influences are measured and a quantitative description of the results is given. An attempt is made to appraise the significance of these developments from both private and social points of view. The study leads to some important divergencies from widely accepted views both as to fact and theory.

The following master's theses were accepted during the year:

A. M. HILLHOUSE. Brazilian Coffee Valorization. (Under the direction of E. W. ZIMMERMANN.)

This study is limited to an evaluation of Brazil's latest experiment in valorization, the so-called "permanent defense of coffee" (1922-1930). In Part I, Brazil's semi-monopoly in coffee production and the nature of the product making valorization possible are sketched, and next the causes of the shift from "sporadic" to "permanent" valorization. In Part II, the defense mechanism in actual operation is described, supplemented by a chronicle of the important changes from year to year. The more important results and effects of permanent defense are examined in Part III. Emphasis is laid on the resultant state of over-production and a further intrenchment of the one-crop system, effect on coffee prices, and the extent to which the individual Brazilian producer has benefited by higher prices. Finally, in Part IV, an attempt has been made at glimpsing into the immediate future. Estimates of the 1930-1931 and 1931-1932 crops, the yearly carry-overs, lower price levels, the effect on Brazil's trade and payment balances, and the probable operation of the new bankers' control after the end of permanent defense on July 1, 1930, are discussed.

The one outstanding cause of the breakdown of permanent defense has been lack of acreage control. It is believed that if "permanent defense" had included some effective method of restricting new plantings it would have succeeded, as Brazil's semi-monopoly has never been seriously threatened.

DONALD FRASER MARTIN, JR. The Naval Stores Industry in the United States. (Under the direction of C. T. MURCHISON.)

This is a study of the development of the naval stores industry from early colonial times to 1931, and an examination of the sources of supply, methods of extraction, distribution, and consumption, with primary emphasis on current conditions and a theoretical analysis of the interactions of the forces of

supply and demand. The most important problem confronting this industry is that of conservation of pine timber resources, and conclusions as to the probable future of naval stores operations are based on the solution of this problem. The most logical solution seems to lead to the adoption of French methods and practices or the like, which would put turpentining operations on a perpetual basis—providing a revolving timber (pine) supply for both the naval stores and the lumber industries.

DEPARTMENT OF EDUCATION

M. C. S. NOBLE has published:

A History of the Public Schools of North Carolina. Chapel Hill: University of North Carolina Press. 1930.

A narrative beginning with the education of indigent orphans and the chartering of schools in the early days of the province and closing with a discussion of State Superintendent Finger's administration in 1896.

These two practices, educating indigent orphans and encouraging private schools, expanded slowly with the years until they met each other, merged, and blended into a single system of free public schools supported by taxation for the children of all classes, rich and poor alike. The story of the expansion and final union of these two forces, originally so different in their objectives, is told in this book. (A second volume bringing the history of the North Carolina public schools to the year 1930 is in preparation.)

A. M. JORDAN has been engaged in the following research work:

Environment Influences on Cheating.

An intensive study has been made of the problem of cheating in Grades IV, V, VI, VII, and VIII in two schools quite different in the social status of their parents. In 1930, 297 children were given the tests of cheating used in the Hartshorne and May investigation, i.e., the arithmetic, completion, and information tests. The double testing technique was used. The tests taken together had a reliability of .75. In the nine classes tested the amount of cheating ranged from 39 to 82 per cent, results quite similar to those found in the original investigation. Attempts were made to discover the causes of the cheating. (1) Direct observations of from 7-10 hours were made of each class by the experimenter and the children's behavior rated, (2) ratings of these children were procured from both the classroom teacher and the playground teacher, (3) the Sims test of economic and cultural level was given, (4) the occupations of the children's parents were listed, (5) censuses were made of the children's playmates four different times at intervals of three months, and (6) scores on the Stanford achievement tests were obtained.

At the expiration of a year from the first test, a second test of cheating was given in order to discover the changes which took place over a year's time. The statistical analysis of these findings is just now being made.

Under PROFESSOR JORDAN's direction a summary of the doctoral dissertation of D. H. BRIGGS (see below) will appear soon in the *Journal of Educational Psychology* under their joint authorship.

WILLIAM J. MCKEE has published:

New Schools for Young India. Chapel Hill: University of North Carolina Press. 1931. Cloth, 435 pp. (Published also in India by the Association Press, Calcutta, under the title, Developing a Project Curriculum for Rural Schools.)

A critical study of ancient, pre-British, and British education in India to discover its strengths and weaknesses with reference to present-day demands and needs. The outstanding experimental schools are described and their contributions are evaluated. A comprehensive survey of village conditions regarding health and sanitation, the village home and its community relationships, the economic, political, and cultural situations is included. This survey is used to determine what needs to be included in a progressive school curriculum to enable village boys and girls to live in their chosen environment and to contribute to its continuous improvement. The study summarizes in a final chapter the steps that need to be taken and the specific objectives and items that need to be included in the curriculum in order to make it functional in the lives of village children.

HOWARD F. MUNICH has published The Present Status of Mathematics Teaching in North Carolina in the March and May issues of *The High School Journal.*

The facts upon which this article was based were obtained by an analysis of the data pertaining to mathematics that are found in the high school principals' reports, which are filed in the office of the State Department of Public Instruction at Raleigh. The data were obtained for all the I. A. A. schools of the state and for all high schools in eight selected counties of the state.

The following doctoral dissertation was accepted by the Department during the year:

DAVID H. BRIGGS. The Influence of Certain Methods of Making the Assignment on the Study and Learning Process in the Social Sciences. (Under the direction of A. M. JORDAN.)

This study gives the results of an objective determination of the influence on the learning process of these five methods of making the assignment: (1) a suggested study procedure; (2) the assignment of pertinent study questions; (3) teaching the meaning of the difficult words found in the selection to be learned; (4) making the pupils aware of the personal value of the materials to be learned; and (5) making the pupils aware of the general meaning of

the materials to be learned. Each type of assignment was tested with 2 fifth-, 2 seventh-, and 2 ninth-grade groups, by using two reading tests of approximately equal difficulty, one testing the information gained in a control situation, the other that gained in an experimental situation. From these data conclusions are drawn concerning the relative influence of the various types of assignment on the combined scores of fifth-, seventh-, and ninth-grade pupils; on pupils of different grade levels; and on the retarded, normal, and accelerated groups.

Teaching the meaning of the difficult words (method 3) was the most influential of the five types in causing improvement on the combined scores of the three grades tested. Using the numbers given above, the other methods of making the assignment ranked from the highest to the lowest influence as follows: 5, 2, 1, 4.

Method 4 was most effective with fifth-grade pupils; method 5 with the seventh-grade pupils; and method 2 with ninth-grade pupils.

The accelerated group made the greatest gain in nine of the fifteen comparisons, the normal in four of the fifteen, and the retarded group made the greatest gain in only two of the fifteen comparisons, these being on tests of word knowledge where rote memory plays a greater part. From the present data the greater gain on the part of the accelerated and normal groups cannot be attributed directly to the influence of the assignment.

The following master's theses were accepted by the Department during the year:

CLAUDE HERBERT ADERHOLDT. An Analysis of Factors Contributing to Over-Age in Pupils in Mecklenburg County Schools. (Under the direction of E. R. MOSHER.)

An attempt is made to list some of the important characteristics of pupils which retard their progress in school. The investigation reveals (a) certain home and school conditions and their effect on the progress of the pupil through the grades, and (b) the attitude teachers have toward slow pupils. All data presented in this study were secured from primary sources. They have been interpreted by means of graphs and tables, showing the rate of progress of the group as governed by the various characteristics.

MINNIE ATKINSON. Intercollegiate Sports and Physical Education: an Historical Study. (Under the direction of E. W. KNIGHT.)

This study, carried out for the purpose of determining whether an intelligent plan of physical education for American college students has been developed, begins with a consideration of the historical aspects of physical training and sports. Athenian, Spartan, German, Swedish, and English training are discussed, and the development of various American collegiate sports is treated.

From this study, it is concluded that the program of sports has been closely related to the economic situation of the people of a country, and in the American college it has been very expensive. This expense has rightly been borne by gate receipts, making the more popular sports finance the whole program. The elimination of the evils of sports has been a question of education and legislation. As a result, it has been rightly a problem of the schools and colleges, but the program for mass participation should start in the schools and not the colleges.

OLIN WYSE BUNDRICK. The Elementary School Principal of South Carolina and His Relationship to Instruction. (Under the direction of M. R. TRABUE.)

This study is concerned primarily with those important activities of the elementary school principals of South Carolina which, in their opinion, are of most help to their teachers. Its major attempt is to show the factors which contribute to the professional growth of the elementary school teachers of that state. A brief summary is also given of the training of and the factors contributing to the professional growth of principals.

The study reveals (a) the worth-while changes which teachers have made in their instruction during the past few years with the causes of such changes, and (b) the activities of principals for the improvement of instruction in their schools. All data presented in the study were secured from primary sources and are interpreted by means of tables and an analysis of the activities which were reported by the teachers and the principals. Special needs for the improvement of the elementary principalship are revealed.

HARDY ABRAM CARROLL. North Carolina Public School Teachers' Retirement System. (Under the direction of N. W. WALKER.)

This study gives a brief history of pension and retirement systems; it contains a list of the outstanding needs of North Carolina and the children and the teachers of the state for a retirement system; it defines certain basic principles underlying a sound retirement law; and, finally, it includes a retirement plan, based on those principles, for the public school teachers of North Carolina. The plan is intended to improve the teaching profession by automatically removing from it all those teachers who have become less effective through age or disability; by encouraging a higher type of young people to enter and to remain in the profession; and by making it possible for every teacher to do better work because he is free from worries regarding his economic future.

FLOYD MILTON COX. The Development of Education in Randolph County. (Under the direction of E. R. MOSHER.)

This study opens with a brief history of Randolph County, its people, its geographical conditions, and its economic life. The following chapters deal with educational conditions from colonial times to the present. The academy

movement was studied in some detail, with emphasis on the Asheboro Female Academy and Trinity College. Educational conditions in the state as a whole were discussed and important school legislation cited. Data were produced to show the development of the high schools of the county in recent years. The final chapter recommends the establishment of three new schools, provisions for adequate classroom supervision, and vocational education and enforcement of the compulsory attendance laws.

BERNICE SPEAR DARDEN. The Predictive Value of the North Carolina Senior High School Examinations in Mathematics and Reading. (Under the direction of E. R. MOSHER.)

The scores on the mathematics section and the reading comprehension section of the High School Senior Examinations and the grades on the two required freshman mathematics courses at the University of North Carolina were used as the basis of this study. The coefficients of correlation between the variables were found to be marked, indicating a small degree of relationship. A range of predicted University grades was ascertained from each of the high school scores. The extent to which mathematical and reading ability affected the correlations was determined. Equations were derived whereby the University grades may be predicted through the use of both the high school subjects. By combining the high school test scores a somewhat higher correlation may be obtained between them and the University grades.

HOMER CLARENCE HUDSON. Baptist Education in South Carolina Before 1860. (Under the direction of E. W. KNIGHT.)

This study shows that after a long period of effort by a few leading Baptists a beginning was made in theological education, and institutions of higher learning for both men and women were established, in spite of much indifference and opposition within the denomination. The missionary impulse and a belief in the necessity of trained leadership led to continued efforts to provide an educated ministry, finally resulting in the establishment of the Southern Baptist Theological Seminary, now at Louisville, Kentucky. Furman University, which at first included the theological school, was founded to provide higher education under denominational control, chiefly because of the interest of citizens of Greenville and of the state in higher education. Similarly, the growing sentiment for the education of women led to the establishment of the Greenville Baptist Female College, now Greenville Woman's College.

The first chapter gives a brief historical sketch of the colonial period in South Carolina; the next is devoted to early efforts toward ministerial education. Following this is a chapter treating rather fully the development of theological training; and the final chapter discusses non-ministerial education under the control of the denomination.

VIRGINIA MAY LOVE. The Value of the North Carolina High School Senior Examinations in English and Reading as a Prediction of the

First Two College Grades in English. (Under the direction of E. R. MOSHER.)

Data were obtained from the freshmen classes entering the University of North Carolina in the autumns of 1927, 1928, 1929, and 1930. Their scores on the English usage and reading comprehension sections of the North Carolina High School Senior Examinations were correlated with each other and with the first two grades in college English to determine their degree of usefulness as a prediction of success in college.

Marked correlations were found, varying from .244 to .615. This fact shows that the examinations can be used with some success as a predictive measure. Regression equations were worked out, showing the weight to be given to each of the two predictive measures in forecasting each of the two success measures. The tests for 1929-1930 are slightly better than the others, and the English test is slightly better than the reading test. The tests combined give a higher correlation than either one used alone.

JESSIE ALLEN PARKER. An Investigation of the Progress in the Comprehension of French Through Silent Reading. (Under the direction of E. R. MOSHER.)

Since one of the chief aims of foreign language instruction is the development of an ability to read with comprehension and enjoyment the literature of another people, the task of teaching students to read satisfactorily constitutes the major part of the teacher's work. Proponents of the silent reading method claim that by it students acquire the desired abilities more quickly and more thoroughly than they do by the conventional methods. The writer decided to subject it to a scientific trial to test the validity of the claims. The experimental technique was used. The American Council Alpha French test was given to the three sections of freshman French at Campbell College. Sections A and C were controlled sections and were taught by the oral-translation method. Section B was the experimental section and was taught by the silent reading method.

The results showed that in the vocabulary test the experimental section made the greater gain. In the grammar test, and the silent reading test, the controlled section made the greater gain. Hence the results of this investigation fail to substantiate the claims made by the proponents of the silent reading method.

ELIZABETH ROOME. A Study of the Principles of Education Underlying "Activity" or "Project" Teaching in Progressive Elementary Schools. (Under the direction of M. R. TRABUE.)

Statements of practice in progressive elementary schools were compared with statements of carefully validated principles of education, and where the relationship could plainly be seen a principle was recorded as being basic to that practice. The conclusions from this comparison call attention to the close relationship that exists between most of the characteristic practices of

the progressive elementary schools and the most fully approved principles of education. Those which seem neglected by the progressive schools are those emphasizing the learning of facts of social worth, the need of drill in habit forming, and the use of the scientific method. The ones emphasized in progressive schools appear to be those which emphasize the need of expert teacher guidance.

CATHERINE SHERARD. The Development of the Secondary, Industrial, and Higher Education of the Negro in Georgia. (Under the direction of E. W. KNIGHT.)

This study attempts to present the need in the State of Georgia for a state-wide, tax-supported system of public schools for Negroes in the secondary, industrial, and higher fields of education. The Negro's progress is hampered by the prejudices which still exist among unawakened whites even after sixty years of Negro freedom, and he is not accorded the privileges that are due him. He has proved that with proper training and opportunity he can enter any field of endeavor, particularly the field of industry. His practical education is being fostered, especially in the county training schools and the three state industrial schools. Teacher training schools are increasing, but the standards are still at a low level. The establishment of the Atlanta University begins a new era in the higher education of the Negro in Georgia. A new Negro has arisen and is taking his rightful place in the vocations and professions in Georgia and the South.

HOWARD HOLMES SIMPSON. The History of Secondary Education in the Southern States Before 1860. (Under the direction of N. W. WALKER.)

This study shows that the development in secondary education in the southern states was in accordance with the environing forces—social, political, religious, and economic. Few Latin grammar schools existed in the South, but the academy, offering a broader, more practicable curriculum, dominated secondary education until 1860 and competed until a later date. The academy has had far-reaching influences. It furnished a program of studies which the first high schools took over practically in toto and which still remains in part. Academies have provided nuclei from which many of our colleges have grown. They were pioneers in teacher training.

With the coming of the monitorial system, the provision in several states for literary funds, and the desire for public control and support which gained impetus in the first half of the nineteenth century, the public high school facilitated in 1867 by George Peabody, banker, became the dominating institution of secondary education.

SCHOOL OF ENGINEERING

H. G. BAITY and E. B. SHORE have continued studies on the experimental treatment of the various wastes resulting from textile pro-

cessing and dyeing to render them suitable for discharge into streams or into sewerage systems tributary to sewage treatment works.

This year's investigations have continued the studies on mutual and chemical precipitation, the optimum hydrogen-ion concentration values for coagulation, color reduction, dewatering and disposal of sludge, and the chemical quality of the resultant liquor with respect to its influence on stream quality, fish life, and the biological agencies employed in sewage treatment processes.

H. G. BAITY and A. B. UZZLE, JR., have continued during part of the year, and brought to a conclusion, a three-year investigation on the effect of chlorination of sewage upon the physical, chemical, and biological conditions of the receiving stream.

The chlorine treatment was found to improve greatly the physical appearance of the stream, reduce turbidity, eliminate odors, remove practically all of the Colon bacilli and other sewage bacteria, increase appreciably the dissolved oxygen, and lower the five-day and total biochemical oxygen demand at all points in the five-mile section of the stream under study. Former results, showing a 25 to 35 per cent decrease in B. O. D. of sewage by chlorination, were confirmed.

T. F. HICKERSON has completed an analysis of the maximum shears and bending moments occurring in multiple-span structures subjected to various loadings, and the restraining influences of continuity and rigidity.

The so-called "fixation" factors equivalent to the reactive effects of empty beams and columns on the loaded members constructed monolithically thereto have been determined in a novel way. Tables of coefficients, based on complex formulas, were compiled in order to render the method of service in the solution of practical design problems.

A study of building frames subjected to both vertical and horizontal loadings has been made with a view to establishing an approximate method (closely true) for determining readily the following: (1) maximum moment at the end of a beam; (2) maximum moment at the center of a beam; (3) maximum moment in an interior column; and (4) maximum moment in an exterior column.

THORNDIKE SAVILLE has published during the year: The Power Situation in the Southern Power Province. *Annals of the American Academy of Political and Social Science,* January, 1931.

A detailed statistical analysis of electric power output, developed and undeveloped water power, and probable trends in power development in the states south of Pennsylvania and Ohio and east of the Mississippi River.

PROFESSOR SAVILLE has been appointed a member of the U. S. Beach Erosion Board, and in that capacity has assisted in the direc-

tion of large-scale experiments on the causes and effects of beach erosion and inlet changes at various points along the Atlantic Coast.

He has continued, with various assistants, studies previously reported on Sand Analysis, Duration of Stream Flow Curves, Drought Studies of 1930, and other investigations of the hydrology of North Carolina.

NEIL P. BAILEY has completed a study on The Response of Thermocouples.

An experimental and analytical study of the response of thermocouples. Part I dealt with the effects of temperature gradients in the hot junction of a couple on the indication of the couple. Part II dealt with the effects of rapidly varying and cyclic temperatures on the response of thermocouples. Besides the experimental study, a reliable mathematical method of calculating the time lag of thermocouples under any condition of operation was developed.

He has the following research in progress:

Heat Transfer from Internal Combustion Engine Cylinders.

An analytical and experimental study of the problem with the view of developing a more rational basis for making such calculations and predictions.

Simultaneous Bending of Columns in Two Planes.

All current column equations consider the action in one plane only. This experimental study, now under way, was undertaken to determine the exact effect of simultaneous bending in two planes when the stiffness of the column is of the same order of magnitude in the two planes.

The following master's theses were accepted by the Department during the year:

ADOLPHUS MITCHELL. A New Method for the Analysis of Stresses in Building Frames Caused by Vertical Loads. (Under the direction of T. F. HICKERSON.)

The purpose of this thesis is to present a new method for the analysis of stresses in building frames caused by vertical loads. The method proposed is based upon a study of fixity and continuity. It makes use of fixation factors which were derived by the direct application of the Slope Deflection method to a substitute-frame. Tables of these fixation factors afford a simple and speedy means of stress analysis.

The proposed method is rapid, is not liable to errors, and gives results that are on the side of safety and approximate exactness.

JOHN BAPTIST PITTANA. A Study of Temperature Variations in Spheres with External Temperatures Suddenly and Cyclically Applied. (Under the direction of NEIL P. BAILEY.)

In this thesis is shown a new application of Heaviside's operational calculus in deriving the theoretical equations for temperature variations in spheres with external temperatures suddenly and cyclically applied. For suddenly applied temperatures, taking into account the film resistance of the hot fluid, the problem is solved for the first time. The problem of cyclically applied external temperatures is entirely new. Experimental verification of the theoretical results for a 5-inch cast-iron sphere gave more than satisfactory results.

RAYMOND FRANKLIN STAINBACK. A Stable Direct-Current Amplifier as First Developed for Oscillographically Recording the Temperature Variations in Thermocouples. (Under the direction of JOHN E. LEAR.)

A discussion of the design and operation of a direct-current amplifier in which a condition of stability was maintained by regulating the temperature of the batteries. The particular amplifier described was successfully calibrated and used for recording very low values of direct-current and low-frequency alternating-current inputs requiring comparatively little attention. The outputs of the amplifier were of the order of five thousand times as great as the inputs.

DEPARTMENT OF ENGLISH

GEORGE R. COFFMAN has published:

Author's Correction—Corpus Christi Plays as Drama. *Studies in Philology,* XXVIII: 688. 1930.

Reviews of *The School Drama in England,* by T. H. Vail Motter, *Journal of English and Germanic Philology* (July, 1931); and *Drama and Liturgy,* by Oscar Cargill. *Speculum,* October, 1931.

A Note on Saint's Legends. *Studies in Philology,* XXVIII: 4. 1931.

PROFESSOR COFFMAN has edited Volume XXVIII of *Studies in Philology.* He is engaged in special studies in the cult of the saints and saints' legends and in Middle English vernacular, religious and moral plays.

GEORGE C. TAYLOR has in preparation:

Some Patristic Survivals in Shakespeare.

The Influence of Du Bartas in the Eighteenth Century.

JOHN M. BOOKER has published:

Reviews of *Imperialistische Strönungen in der Englischen Literatur* by Friederich Bries, *Modern Language Notes,* May, 1931; and *The American Scholar* by Norman Foerster, *Englische Studien,* June, 1931.

A. C. HOWELL has published:

A Note on Ben Jonson's Literary Methods. *Studies in Philology,* XXVIII: 4: 710-719. 1931.

Points out that Jonson's statement that he wrote his verse first in prose is borne out by the fact that in *Timber* are a number of hints and passages which are used over in the later poems and plays.

A Note on John Donne's Sermon XXX, Folio of 1640. *Notes and Queries,* CLXI: 9: 156-157. 1931.

An interesting parallel is noted between a passage in this sermon and one of Owen Felltham's *Resolves.*

W. D. MACMILLAN, III, has published (in collaboration with HOWARD M. JONES) *Plays of the Restoration and Eighteenth Century.* New York: Henry Holt and Company. 1931.

A collection of twenty-four plays appearing between 1656 and 1798, edited with introductions, notes, and biographical sketches of the authors. Many of the plays included in the volume have never before been edited, and several of them have not been reprinted since the appearance of the collections of the early years of the nineteenth century.

ARTHUR PALMER HUDSON has completed:

Folk-Songs of Mississippi and Their Background—A Study, with Texts. (Accepted for publication by the University of North Carolina Press. Abstract in *Research in Progress,* 1929-1930, p. 33.)

He has made a collection of proverbs and riddles in oral circulation in Mississippi.

He has been studying various treatments of the medieval story of the Hermit and Divine Providence.

E. E. ERICSON has published:

The Use of Old English *swa* in Negative Clauses. *Studies in Honor of Herman Collitz,* Baltimore, 1930.

Anglo-Saxon Again. *American Speech,* February, 1931.

The Use of Old English *swa* as a Pseudo-Pronoun. *Journal of English and Germanic Philology,* January, 1931.

Old English *swa* in Worn-down Correlative Clauses. *Englische Studien,* June, 1931.

Reviews of W. P. Cumming's *The Revelations of St. Birgitta, Modern Language Notes,* May, 1931; and Brunner and Hittmair's

Mittelenglisches Lesebuch für Anfänger, Modern Language Notes, May, 1931.

He has had accepted for publication the following studies:

Some Observations on New English Syntax. (*Anglia.*)

Folk Etymologies and Verbal Corruptions in Marietta Holley. (*American Speech.*)

Hesperia: Schriften zur englischen Philologie. Heft 12: "The Use of *Swa* in Old English," 84 S. Göttingen, Vandenhoeck and Ruprecht, 1931; Baltimore: Johns Hopkins Press. 1931. (In press.)

He has in progress the following studies:

A Bibliography of the Writings on Old English Literature.

A History of the English Language.

(In collaboration with URBAN T. HOLMES.) A Bibliography of the Homage-Volume.

LOUIS B. WRIGHT has published during the year:

Social Aspects of Some Belated Moralities. *Anglia, Zeitschrift für Englische Philologie,* XLII: 2: 107-148.

Evidence of the reflection of social propaganda in morality plays during the reign of Elizabeth.

The Renaissance Middle-Class Concern Over Learning. *Philological Quarterly,* IX: 273-296.

Shows the increasing interest of the commercial classes in education throughout the sixteenth and first half of the seventeenth centuries, with the gradual development of utilitarian ideals of education.

John Wesley: Scholar and Critic. *South Atlantic Quarterly,* XXIX: 262-303.

A presentation of Wesley's ideas and comments upon the literature and drama of his own time.

Madmen as Vaudeville Entertainers on the Elizabethan Stage. *Journal of English and Germanic Philology,* XXX: 48-54.

Illustrations of the use of mad scenes for purely extraneous entertainment.

Handbook Learning of the Renaissance Middle Class. *Studies in Philology,* XXVIII: 58-86.

An analysis of the demand in the English Renaissance by the commercial classes for short cuts to learning and culture.

PROFESSOR WRIGHT is continuing his investigations of the literary and cultural interests of the Renaissance bourgeoisie.

RAYMOND ADAMS has completed the following studies:

The Transcendentalist's Part in the Introduction of German Literature to America. Read before the Philological Club of the University of North Carolina.

For the *Dictionary of American Biography,* PROFESSOR ADAMS has written articles on the following: Elizabeth Palmer Peabody, George Ripley.

He is engaged on the following projects:

A biography of Henry David Thoreau.

A bibliography of Thoreauana since 1908.

Biographical article on Thoreau for the *Dictionary of American Biography.* (In collaboration with HENRY SEIDEL CANBY.)

RICHMOND P. BOND has completed the following studies:

English Burlesque Poetry, 1700-1750. Boston: Harvard University Press. (In press.)

(With three collaborators.) A Collection of Chaucer Allusions. *Studies in Philology,* XXVIII: 481-512. 1931.

Shenstone's Heroi-comical Poem. *Studies in Philology,* XXVIII: 742-749. 1931.

He is engaged upon the collection of materials for a definitive study of Joseph Addison as man of letters and affairs, upon an edition of several heroi-comical poems of the eighteenth century, and upon the publication of various unpublished letters by major men of letters.

THOMAS B. STROUP has published:

Dryden and the Royal Society. *Publications of the Modern Language Association,* XLV, September, 1931.

Biron and the 116th Sonnet. *Philological Quarterly,* X, July, 1931.

Launce and Launcelot. *Journal of English and Germanic Philology,* XXX: 506-507.

The following doctoral dissertations were accepted by the Department during the year:

MINNIE M. BRASHEAR. Formative Influences in the Life and Writings of Mark Twain. (Under the direction of HOWARD M. JONES.)

The general impression of Mark Twain during his lifetime was that he was a representative American genius, with an originality comparatively untouched by influences out of the past. Examination of the criticism of his writings through forty years (Ch. I) shows that, though this legend had wide vogue in the popular mind, great difference of opinion existed among circles as to his significance in American letters. The present study has sought to discover how extensively eighteenth-century elements went into the making of his mind and art.

Part I is a preliminary study of the formative years of his life (1835-1861). Free access to the forest and association with old-time darkies and with Southern people of culture gave the boy a favorable start. That Sam Clemens' experience under J. P. Ament on the Hannibal *Courier* and under Orion Clemens on the Hannibal *Journal* (Ch. III) was valuable is proved in his writings for the *Journal* in 1852 and 1853 and by his letters from New York (1853), which show that he was able to take a position as compositor with one of the largest printing companies in the city. He had also had experience as reporter and feature story writer, and with the columnist type of humor, including experiments with social and political satire and newspaper verse. The *Wanderjahre* from 1853 to 1861 (Ch. IV) fall into three periods. In the first and third of these were important eighteenth-century influences. The letters he contributed to the New Orleans *Crescent* in 1861 show that, as a result of this reading, he tried his hand at a different type of humor from that contributed to the Keokuk *Post* four years before. But from the point of view of its formative value this period must be considered of secondary importance to the Hannibal years.

Part II attempts to establish the eighteenth century provenience by a search for evidences of it in characteristic phases of Mark Twain's writings. Chapter V shows that, in the treatment of what is the central theme in his writings, human nature, he followed eighteenth-century literary models and reflected eighteenth-century philosophical ideas. Chapter VI reveals important parallels between his writings and those of eighteenth-century humorists in themes and types, and a few evidences of indebtedness. Chapter VII is a study of Mark Twain's reading. He found greatest delight in histories, travel books, and biographies, including letters and memoirs, but he read a good deal of fiction and poetry of the Kipling type. He used what he read in his writing for general inspiration, as a source of his themes, and as "exhibits" to supplement his own presentation. The writers whose books seem to have formed his permanent reading list are St. Simon, Cervantes, Gibbon, Pepys, Lecky, Carlyle, the Bible, Greville, Dana, Swift, Baron Trenck, DeFoe, Lesage, and Goldsmith. He mentions in addition Burns, Ossian, Junius, Johnson, Gray, Fielding, and Smollett. The eighteenth-century provenience cannot be neglected in any attempt to account for Mark Twain's mind and writings.

HARRY KITSUN RUSSELL. Certain Doctrines of Natural and Moral Philosophy as an Approach to the Study of Elizabethan Drama; with

an Appendix Containing Illustrative Material from the Plays of Ben Jonson. (Under the direction of GEORGE C. TAYLOR.)

The aim in this study has been to present the doctrines of natural and moral philosophy in greater detail and with more coherence than they have hitherto been described. In the interest of clarity of detail, each important doctrine or principle has received separate treatment. For the sake of coherence the subject has been examined not as "physiology *and literature*" or as "psychology *and Shakespeare,*" but as a science worthy of research in and for itself.

From representative philosophers of the classical, medieval, and Renaissance periods, statements of the doctrines of the four elements, the four humours, and the three spirits, with an account of the workings of the microcosm as a whole, have been gathered in such a way as to present the main tenets of natural philosophy. In a similar manner, in the field of moral philosophy the divisions of the soul of man with the faculties of each part, the four temperaments according to which men's characters were studied, and the concupiscible and irascible passions have been described in detail. In this way a unified account of those doctrines of natural and moral philosophy which form the background of an important part of the thinking of the Elizabethan dramatists has been presented.

The study also suggests that the dramatic poetry of the Elizabethan period owes much of its intensity to the lore of natural and moral philosophy. The playwright found ready the vocabulary and principles of a well-organized science. In his exposition of mental processes and in his vivid presentation of passion, he had only to draw upon the accepted psychology of his day. Few artists have ever had material more inherently poetic in terminology or more dramatic in conception.

In an appendix, material from Jonson's plays has been assembled to indicate the extent to which these doctrines are susceptible of dramatic treatment, and to show their value to the dramatist in his effort to portray thought and emotion accurately and intensely.

HAZEL ALLISON STEVENSON. Herbal Lore as Reflected in the Works of the Major Elizabethans. (Under the direction of GEORGE C. TAYLOR.)

The purpose of this study is to investigate the herbal knowledge possessed by leading Renaissance poets and dramatists, indicating the sources of their knowledge, the extent to which it appears in their writings, and its significance. Part I gives a history of the English herbal. It shows the reason for its existence—the fact that the unlettered English housewife was the practical physician for the great body of the common people. It gives the three strains influencing the material of the herbal: (1) the classical, predominantly, stretching back from the Roman School to the Greek, and on to the beginnings of Egyptian medicine; (2) to a lesser extent, a mass of folklore in the Anglo-Saxon leech books and in oral tradition, reaching back into the mysterious

past; (3) and, finally, a body of English material, applying specifically to English plants. Since the claim is not made that the writers derive their information from the herbal, its value for this study lies in the fact that it shows the current beliefs about each herb.

The major figures of the period differ greatly in their use of herbal material. The great epic poets, Spenser and Milton, writing in elevated style, tend to confine their references to classical allusion, though Spenser manifests at times a homely realism reminiscent of Virgil but in accord with the practices of rural England. Jonson indicates an infinity of knowledge of every variety and from every source. Shakespeare's many allusions are always close to the experience of the people.

The herbal material used may be divided into two distinct types: the picturesque treatment of botanical superstition, and the serious presentation of reputable drug plants. All the plant doctrines of the sixteenth and seventeenth centuries: of signatures, of sympathy and antipathy, and of astrological botany, as well as some minor beliefs, find place in poetry and drama. Folklore is prominent, especially in the works of Shakespeare, Ben Jonson, Beaumont and Fletcher, Middleton, Drayton, and Sylvester. A study of this appeal to folk belief leads to the conclusion that in most instances the writer is aware he is using fictional material to gain his effects. The drug material which he introduces seriously is usually in line with the best medical beliefs of the day, in many instances still holding place in the Pharmacopoeia. A large body of literary allusion, especially in humorous and realistic scenes, can be properly interpreted only by reference to the herbal knowledge of the period.

EDWARD PINCKNEY VANDIVER, JR. The Parasite in Elizabethan Drama. (Under the direction of GEORGE C. TAYLOR.)

The Elizabethan dramatic parasite is a highly composite character as a result of various influences. This complexity illustrates the omnivorous nature of the Elizabethan dramatists in their search for material and their ability to form the divergent strands of influence into a new character to fit their particular purpose, either for comedy or for tragedy. Merygreeke is directly influenced by Latin comedy. The Italian *commedia erudita* is responsible for the creation of Pasyphilo and Pedante. The influence of the *commedia dell'arte,* in which a premium is set on improvised clownery, is discernible in Penulo, Slipper, and Nathaniel. The German-Dutch "Christian Terence" school drama, which emphasizes the immorality, villainy, and culpability of the parasite, offers a prototype for Eccho and his successors. A similar influence is exerted by the Vices and wicked advisers of the moralities and by the evil counsellors of Senecan tragedy. These last three types of drama, opposed to the earlier comedy in their serious and didactic tone, treat the parasite as an evil adviser who corrupts the morals and sagacity of young people and rulers. This parasite, usually attached to the court, is the most common as well as the most composite type in Elizabethan drama. The court parasite is often influenced by the malicious favorites of Roman, Italian, and Eliglish history as well as by the parasites in contemparary life.

The most brilliant handling of the parasite naturally occurs in the work of Shakespeare and Jonson. Both dramatists were fond of fusing two stock characters into the parasitical braggart soldier. In Shakespeare's great creations the stock character disappears, but in Falstaff and Iago together appear all the traits of this figure. Iago—a dependent, tempter, evil counsellor, intriguer, pander, and villain—represents the acme of the development of the parasite into a tragic figure in contrast to Falstaff, who, as a buffoon, intriguer, gormand, flatterer, and dependent, represents the culmination of the development of the parasite as a comic figure. Jonson likewise has embodied almost all of these elements in two of his dramatic creations—Mosca and Sejanus.

The following master's theses were accepted by the Department during the year:

FLORENCE AHNER. Courtesy Book Subjects and Ideas in the Plays of James Shirley. (Under the direction of GEORGE C. TAYLOR.)

This study treats the seventeenth-century dramatic and non-dramatic interest in the courtesy books and its reflection in the plays of James Shirley. The present writer does not attempt to determine the exact degree of influence exercised by the genre upon the plays considered, nor to interpret the books as literary sources. As is the case in the character books, the essays, and the plays of his contemporaries, the characterization of Shirley's works reflects the stock figures of the courtly genre—courtier, prince, and ideal lady. His courtiers manifest transitional tendencies: they have attributes of the complete gentlemen of the Renaissance as well as of the Cavaliers of Stuart times. The contemporary interest in tyranny has influenced his conception of the prince. His feminine characters reflect the high ideal of womanhood of courtesy book writers. Evidence of Shirley's acquaintance with this type of literary form is found in his preoccupation with typical subjects and methods revealed in the courtly and idealistic treatises.

HELEN JAMESON CROSSEN. The Treatment of Death in the History Plays of Shakespeare. (Under the Direction of GEORGE C. TAYLOR.)

This study examines the ten history plays of Shakespeare in the light of the various factors influencing the treatment of death. It considers the influence of medieval conceptions, Senecan tragedy, the *Lives* of Plutarch, the *Chronicles* of Holinshed, and the folk customs of the time. Variation in the nature and number of the references to death have also been considered. The plays were found to reflect some imagery and phraseology from characteristic medieval conceptions. The influence of Senecan tragedy is observed in the colorfulness of scenes of blood, a stoic calm in the face of death, and the use of emotional scenes; the influence of Plutarch in the continued conviction that the true test of a noble life is in a calm and noble death, and

in the fact that one's personal destiny is of secondary importance to the welfare of one's country, a conception restraining the melodramatic influence of Seneca. A decided increase in the variety of references to death differentiates the *Henry VI* trilogy from the later plays. Finally, the power of the dramatist to transcend source material in depicting scenes of death is pointed out.

FLAVEL SCOTT ELLIOTT. Emerson as a Lecturer. (Under the direction of GREGORY L. PAINE.)

This thesis sets forth aspects of Emerson as a lecturer. The first chapter contains a brief account of the origin, nature, and history of the lyceum. Special attention is given to the development of the lyceum from the religious lectures of the early New England Puritans, and to those phases of the lyceum movement which have some bearing on Emerson's lecturing activities. The second chapter deals with such problems as why Emerson chose lecturing as a profession, where he went on his lecturing tours, what types of audiences he had to deal with, and how he appeared as a public speaker and lecturer. In addition, the development of the lectures into the essays is treated in this chapter. Later chapters contain chronological lists of Emerson's lectures, occasional speeches, and college addresses. These lists are not exhaustive, for many of Emerson's lectures have not been recorded; they purport to be lists of those lectures, speeches, and addresses which have been recorded in the works of the various authorities on Emerson.

LELIA HAMPTON. Studies in Beaumont and Fletcher's Theories of Kingship. (Under the direction of GEORGE C. TAYLOR.)

Commentators usually state that Beaumont and Fletcher were panders to the court, royalist in sympathy, and that their dramas were written exclusively for the approbation of courtier and king; but a careful study of the plays reveals the fact that such criticisms fail to do justice to the art of the poets.

Beaumont and Fletcher, in making use of current political material in the development of plot, were clearly following Renaissance literary convention. They were deeply interested in politics, especially in the theories of the day concerning courtier and king, and were familiar with the literature dealing with the conduct of kings. A careful study of their plays reveals an absence of prejudice, making it possible for them to exhibit sympathetically the varied and opposing types of Renaissance character as laid down in current treatises on the subject, as well as strikingly contrasting theories of kingship. Thus their dramas become a means of understanding the political moods of the Renaissance. Moreover, Beaumont and Fletcher in their treatment of the political philosophy of Machiavelli set aside Renaissance traditions and gave to his political theories an interpretation that is in keeping with what modern research considers the true meaning of his counsel to rulers.

Mary Jane Hill. Sydney Smith as a Literary Critic. (Under the direction of Howard M. Jones.)

The study shows Sydney Smith's fitness and preparation for literary criticism, his methods and principles of literary criticism and his theories of literature. The first chapter sketches his life, emphasizing his contacts with all types of men and especially his intimate association with the leaders of his day in politics, science, and literature. The second chapter discusses Smith's education in the classics and wide reading. The third chapter takes up his literary criticism itself, both in his formal criticisms in the *Edinburgh Review* and in his letters and conversation. His method in a formal review is to summarize briefly the work under discussion and then to express his opinion of it. The fourth chapter shows that Smith combined qualities of the impressionistic with those of the neo-classic school, and thus was on the border line between the schools of criticism of the eighteenth and nineteenth centuries. The last chapter presents Smith's attitude toward various forms and types of literature and shows how, taking into consideration his attitude toward the classics and toward the romanticists, he belongs entirely, in his theories of literature, to the eighteenth century.

James Howell. The Rogue in Non-Dramatic Literature to Robert Greene, Preliminary to a Study of the Rogue in Elizabethan Comedy. (Under the direction of George C. Taylor.)

This study discusses rogue characters in non-dramatic English literature to 1591. In Chapter I it deals with rogue characters in foreign literatures which influenced Tudor literature. English rogues are treated in Chapter II. Chapter III summarizes the traits of each foreign type of rogue and compares him with the English genre. The thesis is preliminary to a doctoral dissertation on the rogue in English Comedy to 1642, a subject on which the writer is now at work.

Sadie Franklin Jenkins. Figurative References to Nature in Shakespeare's Three Earliest Comedies, His Earliest Tragedy, His Earliest Chronicle History Play, and in *Titus Andronicus* and *Henry VI.* (Under the direction of George C. Taylor.)

This study reveals the fact that in the five known plays figurative allusions drawn from the natural world are often instinctively used by Shakespeare where he desires a means of illuminating a mental concept. The source from which the nature figures are most frequently drawn is that of the animal world, with aspects of the sky, sun, moon, stars, etc., second in importance. The nature figures are predominantly conventional, with a notable tendency toward the use of figures which seem to be drawn from the dramatist's own experience. The figurative nature references are frequently colored by the inter-

fusion of lyrical and idealistic elements. In the *Henry VI* plays and in *Titus Andronicus* nature figures present similarities to those found in the plays of known Shakespearean authorship. These similarities, though insufficient as a means of determining finally the authorship of the plays, are marked enough to give some justification for the idea that Shakespeare had a share in their composition.

JOHN ANGUS MCLEOD. The Southern Highlands in Prose Fiction. (Under the direction of GREGORY L. PAINE.)

This study attempts to describe the prose fiction, including early prose narratives, written concerning the region designated as the Southern Highlands—that part of the Appalachian range lying south of the Mason and Dixon line. It gives a descriptive bibliography with some consideration of the sociological conditions that have constituted the actual background for fiction and of the traditional aspects of fiction of the region. Since frontier conditions persisted in the mountains, the fiction may be considered as a reflection of the life, social customs, and language of a large homogeneous group whose social development has been arrested at a relatively early stage of development. Moreover, although tradition as found in the fiction of the region does not conform in many important details to the actual background, yet writers, from the earliest narratives to the mdoern novels regardless of their literary shortcomings, have possessed the "instinct for vicinage" and have depicted whatever of the life they felt to be significant.

EUNICE STACY MACKAY. The English Political Traveler in the Age of Elizabeth. (Under the direction of A. C. HOWELL.)

Travel literature has at all times exercised a considerable influence on the other writings of the period. This was peculiarly true of the Elizabethan writers. Numerous books on every phase of travel, arguments for and against, precepts, descriptions of new lands, and long "discourses" concerning the political conditions of the various European nations poured from the press. With these books the first chapter of this thesis is concerned. The second chapter presents thumb-nail sketches of various travelers who fall naturally into three groups: intelligencers, agents, and ambassadors, collecting and classifying these writers. All those whose writings deal with the "new world" have been rigidly excluded from the list, and only the travelers who fall into the three named groups have been considered. Each of the three groups has a type-member whose career and writings have been traced at length. The final chapter traces travel influences of the writers named in the preceding chapters upon the literature of the period. Numerous specific references to these persons are pointed out, long passages are taken almost word for word from their writings, and references to customs and folk tales are culled from these same sources. These traces of travel lore serve to show the pervasive power of the travel literature upon the general writing of the Elizabethan Age.

James Benjamin McMillan. Thomas Hardy's Views on Sex. (Under the direction of John M. Booker.)

This study analyzes in four main aspects Thomas Hardy's views on sex: (1) the part played by maladjusted sex relations in Hardy's conception of life; (2) Hardy's view as to the causes of maladjustment of sex relations; (3) the reception accorded Hardy's views by his contemporaries; (4) the sources of his views on sex. It is shown that in Hardy's opinion a large share of the misery of life is due to maladjustment of relations between the sexes. He sees at the root of man's unhappiness a conflict between the fundamental laws of nature and the artificial laws of man. The resultant discord is the basis of much unhappiness. It is shown that Hardy was attacked on three scores: his radicalism, his use of tabooed subjects, his treatment of such material. Finally, the possible sources of Hardy's ideas on sex are considered.

Dorothy Mumford. The Idea of Progress in Ralph Waldo Emerson. (Under the direction of Norman Foerster.)

This study sketches briefly the history of the philosophy of progress and its companion doctrine, evolution, from their origin to the present, and in the light of this background examines the thought of Ralph Waldo Emerson. The thesis proper considers two related questions in regard to Emerson and the idea of progress (1) How far does Emerson's thought reflect in its development this theory of progress? (2) What were the forces working for and against the conclusions at which he finally arrived? The two sources from which Emerson derived his knowledge of the idea of progress—the popular beliefs of the age and his reading—are discussed. It next traces his modifications of the idea of progress and the form it took in the central core of his philosophy formulated by 1841, and, finally, the change of emphasis on certain aspects of the idea wrought in his later thought by the triumphs of science in the nineteenth century. It is notable that while Emerson in his early period denies the progress of the race, he builds his philosophy around the idea of progress within the individual; it is notable, also, that with age his optimism concerning the progress of the race increased.

Lucile Turner. Anticipations in the Renaissance of the Quarrel Between the Ancients and the Moderns. (Under the direction of W. F. Thrall.)

A comparative study of the Ancients and the Moderns in two periods, that of the Battle of the Books and the Renaissance, with a view to determining to what extent the quarrel between the Ancients and the Moderns was anticipated in the earlier period. The examination has been made in the light of two literary theories as to the origin of the quarrel. The older idea was that the English Battle of the Books was largely literary, and came as the result of the slightest earlier French quarrel imported by the exile St. Evremond. Lately scholars have sought to prove that the English quarrel was philosophical and

scientific rather than literary, and was the crystallization of earlier native revolts in science and philosophy. This study keeps as much as possible to literary anticipations. The point of view has been that of anticipations rather than of cause and effect. The two main divisions of the anticipations of the quarrel between the Ancients and the Moderns are the growth of the idea of progress and the revolt of the vernaculars against the ancient tongues. The first is collected largely from secondary sources, but the second is an original collection.

R. M. WALLACE. William Cobbett: The Poor Man's Friend. (Under the direction of HOWARD M. JONES.)

A study of the works of Cobbett in connection with the changes in the economic situation and economic theory of the early nineteenth century was made with a view to determining his opinions and his objects in writing. It was found that he centered his attacks on Malthus and his theory of population because he considered it unfair. Cobbett denied the truth of the theory, stating that population would and could not increase beyond the means of subsistence, though it would increase to the highest point possible at which all could secure sufficient food to live. He also opposed the emigration schemes fostered by the Malthusians because he believed that the movement of laborers away from England stripped the country of its most valuable citizens. In a chapter on his literary theory and practice it is shown that he believed that all writing should be of use in the program of social and economic reform which he proposed. His primary object was to ameliorate the condition of the English poor, and his attack on Malthus rested largely on the assumption that Malthus was the source of much of the misery then being experienced.

MITCHELL PRESTON WELLS. The Plays of George Colman the Younger: a Critical and Historical Study. (Under the direction of W. D. MACMILLAN, III.)

This study undertakes to present the dramatic conditions and tendencies of the years between 1784 and 1822 as reflected in the plays of George Colman the Younger. A running survey of the times and tendencies is given, and each one of Colman's dramatic writings is studied historically and critically as the work of a typical playwright of the period writing primarily to please the audiences of the time. It seeks to attain, through the study of a minor playwright, a more complete understanding of dramatic conditions during the late eighteenth and early nineteenth centuries.

DEPARTMENT OF GEOLOGY

COLLIER COBB has continued his studies of Dune Sands and Wind-blown Soils of the Mississippi Valley.

PROFESSOR COBB presented a paper on Dune Sands and Wind-blown Soils of the Mississippi Basin (lantern) at the meeting of the North

Carolina Academy of Science, Raleigh, May, 1931. This will be published in the *Journal of the Elisha Mitchell Scientific Society,* Vol. 47, No. 2.

He also presented at the Congrès International de Géographie in Paris, September, 1931, a paper on Dune Sands and Eolian Soils in relation to present and past climatic conditions of the continent of North America. Projection. To be published in the *Compte-Rendu* of the Congress.

W. F. PROUTY has published during the past year:

A Bituminous Fossil Plant. *Science* (New Series), LXXII: 527. 1930.

Triassic Deposits of the Durham Basin and Their Relation to Other Triassic Areas of Eastern United States. *American Journal of Science* (Fifth Series), XXI: 126: 473-490. 1931.

PROFESSOR PROUTY carried on research during the year on the relation of geological structure to soundness in a number of marble quarry areas in various parts of the country. Some of this information is being compiled for use in a book: Geology Applied to Engineering.

At the present, PROFESSOR PROUTY is working with the State Geologist on the revision of the geological map of North Carolina. This will probably take two years or more.

WILLIAM CLIFFORD MORSE has published during the year:

Paleozoic Rocks. Mississippi State Geological Survey, *Bulletin No. 23.* 1930.

A monograph on the distribution, stratigraphic sequence, fossil content, and economic importance of the Paleozoic rocks of Mississippi and the adjoining parts of Alabama and Tennessee. Instead of the Paleozoic rocks covering parts of three counties in Mississippi, the report shows that they are confined to one, namely, Tishomingo, the northeast county of the state. By a detailed study of the stratigraphy and of the fossil faunas, eleven—rather than four—formations were recognized and fully described. Some of the more abundant and important fossils are illustrated; and two new species of Brachiopoda are named, illustrated, and described. Part VIII on economic geology, prepared in 1928 after the other parts had been submitted in partial fulfillment of the requirement for the degree of Doctor of Philosophy from the Massachusetts Institute of Technology in 1927, considers especially the asphalt deposits, petroleum and natural gas, and sandstone for building purposes.

A Natural Bridge, Georgian Bay. *Canadian Geographical Journal,* II: 3: 247-252. 1931.

In addition to a description of a natural bridge formed by the Wisconsin glacier leaving a block of dolomitic limestone stranded across a joint which subsequently widened until the block bridged the crevasse, this article illustrates and describes a series of old shore lines formed by the predecessors of Georgian Bay along the stretch of land separating Georgian Bay from Lake Huron known as Bruce Peninsula.

GERALD R. MACCARTHY has been carrying on investigations of the beach sands of the Atlantic Coast of the United States. He has published:

Beach Sands of the Atlantic Coast. *Science* (New Series), LXXIII: 1889: 284-285. 1931.

Another paper, entitled Coastal Sands of the Eastern United States, has been accepted for publication by the *American Journal of Science.*

A paper on Beach Sands was read before the Elisha Mitchell Scientific Society March 10, 1931, and one on the $CaCo_3$ Content of Certain Beach Sands was read before the North Carolina Academy of Science May 9, 1931.

The following master's thesis was accepted during the year:

WILLIAM THOMPSON HOLLAND. A Geophysical and Geological Survey of the Northern Part of the Deep River Triassic Basin. (Under the direction of COLLIER COBB.)

The work described was a geophysical deep measurement experiment, and a geological survey of the Triassic sediments from Chapel Hill, N. C., to Durham, N. C. The geophysical measurements went to a depth of 13,500 feet. Two electrical porous-pot geophysical methods, Lee and Wenner, were used. After the geophysical survey was completed, the author made a thorough geological survey of the area for the purpose of proving the geophysical graphs from surface geological evidence. The geological survey also made possible a more accurate interpretation of the geophysical graphs. The results of the experiment and study are summarized in the following conclusions: 1. the Triassic sediments in the New Hope Creek vicinity reach a depth of 4,500 feet; 2. the Triassic basement is made up of metamorphic slates formed from volcanic ash; they lie on top of deep-seated igneous masses; 3. the thickness of the metamorphic slates that underlie the Triassic deposits of the New Hope Creek vicinity is 2,500 feet; 4. the intrusions of the northern part of the Deep River Triassic Basin are of two kinds, aplite and gabbro.

DEPARTMENT OF GERMANIC LANGUAGES

E. C. METZENTHIN enlarged during the summer of 1930 his comparative study of Old Germanic manuscripts in the libraries of Central Europe by an investigation of the extant manuscripts of the Old Saxon poem, the *Heliand,* the fragments of Otfrid's *Evangelienbuch* (Circ. 870), found in the University library at Bonn and in the Ducal library at Wolfenbüttel. As a result, he published The Codex D (iscissus) of Otfrid's *Evangelienbuch*—an Unorthodox View. *Studies in Philology,* XXVIII: 3. 1931.

Here for the first time the orthodox view of the Germanists is challenged by the assertion that the two sets of fragments at Bonn and Wolfenbüttel were certainly not written by the same scribe, and were probably never a part of the same manuscript.

PROFESSOR METZENTHIN has arranged visits to the libraries at Bonn and Berlin for the summer of 1931 and will pursue research in the Staatsbibliothek at Berlin and in the monastery of St. Gaul in Switzerland, the latter for the study of one of its main treasures, the renowned manuscript of Tatian's *Evangelienharmonie* of the second half of the ninth century.

He contributed a review of *Studien zur Althochdeutschen Benediktinerregel,* by Ursula Daab, to the *Germanic Review,* VI: 2. 1931.

The following master's thesis was accepted by the Department during the year:

RALPH STOKES COLLINS. Hebbel and Tragic Guilt. (Under the direction of KENT J. BROWN.)

In his theory of tragic guilt, Hebbel shifts the emphasis from the traditional moral guilt to a more metaphysical guilt, entailed by the process of individuation itself—the guilt of the individual toward the Whole, the Idea. This guilt comes from the fact that the individual separates himself from the Whole, presuming to make himself the center of the world. As illustrated in Hebbel's tragedies, his theory results in careful motivation and the consequent justification of each individual from his point of view. The necessity of the catastrophe is always evident, and the sympathy which comes from the justification of the hero causes a great tragic effect. As a theory, Hebbel's conception of tragic guilt represents a great advance in dramatic thought over those dramatists and thinkers preceding him.

DEPARTMENT OF HISTORY AND GOVERNMENT

WILLIAM WHATLEY PIERSON, JR., has begun work on a volume of a bio-bibliographical nature on Henry Harrisse. He is undertaking this work at the request of the family of the late Professor E. V. Howell, Dean of the School of Pharmacy. The important collection of materials, manuscripts, and letters relative to Harrisse, which had been gathered by Dean Howell, have been made available to the use of Professor Pierson.

MITCHELL B. GARRETT will publish in the October or January number of the *American Historical Review* a paper entitled, The Call for Information Concerning the States General.

The paper is based almost entirely on research in the Archives Nationales at Paris, and explains what use the government made of the information submitted in response to the call issued on July 5, 1788.

He has in preparation a volume which will bear the title, The Organization of the States General, July 5, 1788—January 24, 1789.

An intensive study of the period indicated, based on all available manuscript and printed sources. Two chapters are completed and others in rough draft. It will be followed by another volume on the elections to the States General.

L. C. MACKINNEY has published during the year:

The People and Public Opinion in the Eleventh-Century Peace Movement. *Speculum,* V: 181-206.

Bishop Fulbert of Chartres: Teacher, Administrator, Humanist. *Isis,* XIV: 285-300.

PROFESSOR MACKINNEY is editing, with the assistance of MISS FRANCES HARPER of Baton Rouge, La.:

The Correspondence of Bishop Fulbert of Chartres, with an introductory survey of his life, for the *Records of Civilization Series,* published by Columbia University.

FLETCHER M. GREEN has published during the year:

Constitutional Development in the South Atlantic States, 1776-1860. Chapel Hill: University of North Carolina Press. 1930. Cloth, xiv, 328 pp.

Sketches of General Duff Green and Benjamin E. Green in the *Dictionary of American Biography,* Vol. VII.

C. C. CRITTENDEN has published during the year:

The Seacoast in North Carolina History, 1763-1789. *North Carolina Historical Review,* VII: 2. October, 1930.

Ships and Shipping in North Carolina, 1763-1789. *North Carolina Historical Review,* VIII: 1. January, 1931.

Inland Navigation in North Carolina, 1763-1789. *North Carolina Historical Review,* VIII: 2. April, 1931.

The following studies for the master's degree have been undertaken under the direction of C. C. CRITTENDEN:

IRA WILSON BARBER, JR. The Ocean-Going Commerce of Port Roanoke, 1771-1776.

JASON B. DEYTON. History of the Toe River Valley, North Carolina.

MARGARET HIGHT. The Council in Colonial North Carolina.

JAMES CARLISLE STABLER. History of Calhoun County, South Carolina.

JAMES KELLY STILES. History of Cherokee, Clay, and Graham counties, North Carolina.

The following doctoral dissertations were accepted by the Department during the year:

CHARLES B. ROBSON. The Influence of German Thought on Political Theory in the United States in the Nineteenth Century. An Introductory Study. (Under the direction of W. W. PIERSON, JR.)

In this study individuals and groups who were affected by German thought are considered from the points of view of the sources and nature of their political ideas and of their places in the development of political theory in the United States. Those who are given extended treatment are: (1) Carl Follen and the New England reformers; (2) German liberals and radicals in America, especially Carl Schurz; (3) Francis Lieber; (4) the post-war nationalists; and (5) the publicists of the last two decades of the century.

German philosophy, as brought to America by the first two of these groups, helped to provide a new basis of moral idealism for the old natural rights philosophy. Francis Lieber, whose political ideas were derived from Kantian idealism, from the German historical school, and from his study of Anglican institutions, paved the way for the rejection of the natural rights philosophy, advanced an historical-organic theory of national existence, and began the systematic study of political science and history as coördinate subjects. In efforts to give expression to new conceptions of nationalism, post-war theorists

drew upon Lieber, the German historical school, and Hegelian philosophy. In the last two decades of the century the tendencies which had appeared in Lieber and the post-war nationalists found their culmination in the systematic study of political institutions from the historical and philosophical and the purely historical points of view by men who had been trained in German universities.

SAMUEL DENNY SMITH. The Negro in Congress, 1870-1901. (Under the direction of J. G. DER. HAMILTON.)

The purpose of this study is to survey the careers of all Negroes who served in Congress during the period under discussion, and to attempt to evaluate their achievements. Besides an examination of the records, the writer has interviewed Negro leaders to obtain their opinions of their political pioneers. Three ex-Congressmen are living; one was interviewed in person, the others by letter. As a background, the first chapter shows the percentage of Negro population in the eleven seceding states, and also in counties which had the largest Negro percentages. Additional tables are compiled to show the number of Negroes in all Congresses of the period, their racial stock, education, previous profession, and social status before the Civil War.

Chapter II undertakes to give the story of Revels and Bruce, the only Negroes who served in the Senate. As they were from Mississippi, political conditions in that state receive considerable attention. Revels and Bruce are taken through their terms, and a running account is given of their work on committees and on the floor. Quotations from speeches are used, and an analysis is made of their votes on important measures. A brief sketch is given of their careers after their retirement from the Senate.

The next two chapters follow the same method for outlining the stories of the twenty men who served in the House of Representatives during Reconstruction and after Reconstruction, respectively. In addition, the Congressional elections are sketched in order to understand the characteristics of the individuals. Extracts from speeches of all members are given in order to point out the main issues they supported in the House. In the same manner as for the Senators, a brief sketch is given of each Representative after he retired, and an attempt is made in a general way to rank each in relation to the others.

Chapter V deals with about thirty Negroes who were unsuccessful candidates. The stories of a few of these deserve detailed narration and an explanation as to how narrowly they missed election. In the case of the others, a table shows the year they ran and the state in which they lived.

In the concluding chapter, many judgments are quoted to show the conflict of opinion as to whether they failed and, if so, the reasons for their failure. The writer is inclined to accept the contention that these men were much superior to those in politics within the states, but that they failed to accomplish anything worth while because they concentrated their energies on racial matters to an excessive extent and neglected national measures.

The following master's theses were accepted by the Department during the year:

ELIZABETH CALDWELL. Reconstruction in Yazoo County, Mississippi. (Under the direction of J. G. DER. HAMILTON.)

This study attempts to analyze the social, political, and economic conditions prior to 1865, during the years of provisional government and the period of Congressional reconstruction. Yazoo County was and is chiefly an agricultural county situated in the Black Belt. Wealthy and progressive prior to the war, it presented a devastated scene at its end and a still more melancholy picture during the days of Congressional reconstruction. The overthrow of slavery with the granting not only of freedom but social and political equality paralyzed the social, economic, and political structure of the county. From the very first Congressional reconstruction, Yazoo County was under Republican control and dominated by Negroes and carpetbaggers. The people were oppressed, but submitted to this oppression because they realized that by challenging any act they would only make conditions worse. Violence was resorted to in a few instances when conditions became unbearable, and in 1875 carpetbag and Negro government was finally overthrown.

MAXCY ROBSON DICKSON. Political Ideas of American Socialists. (Under the direction of W. W. PIERSON, JR.)

This study seeks to analyze the views of American Socialists on the theories of the organization and functions of government. It is in two divisions: (1) the theories of the Socialist-Labor Party, which are based on the concept of an industrial government; that is, industries are to take the place of the present political or territorial divisions of government. They propose to establish this order by calling on all workers to seize the industries. (2) the theories of the Socialist Party, which are attempts to apply socialist principles to the present political order. The party is attempting to build up a strong political organization for this purpose. Since it is the more conservative, it is the stronger and more respected of the two groups of American Socialists.

WILLIAM MCKINLEY GRUBBS. The Diplomatic Aspects of the Behring Sea Controversy Through the Arbitration of Paris in 1893. (Under the direction of K. C. FRAZER.)

The following study is a treatment of the Behring Sea controversy from 1886 through the arbitration at Paris in 1893. After surveying briefly the history of the fur-seal question prior to 1886, it treats the seizures of 1886 and 1887, Bayard's negotiations to reach a joint agreement with the interested powers without any decision as to the question of exceptional jurisdiction, the failure of the negotiations because of the opposition of Canada, and the action of Congress on the question in 1889. An effort is then made to treat Blaine's attempts to secure the coöperation of Russia in protecting the fur seals, his arguments in defense of the seizures, and his negotiations leading to the treaty of arbitration. Lastly, it deals with the arguments presented

by both sides and the decision of the arbitrators on the questions at issue with special reference to the opinions of the American arbitrators.

ELIZABETH C. COUCH. The Political Theories of Francis Lieber. (Under the direction of W. W. PIERSON, JR.)

This study of the life and works of Francis Lieber is intended to show that his political writings are valuable and interesting mainly on account of their priority in this country, that his influence on university teaching and research is important, and that his most permanently valuable works are practical contributions to military and international law. The thesis analyzes his ideas on such subjects as the origin of the state, civil liberty, the nature of the state, sovereignty, constitutional law, and military and international law. It contains comparisons with similar works and attempts to derive Lieber's ideas from works that he read and from the circumstances of his life.

MINNIE HOLLOWELL. The Doctrines and Practices of the Anabaptists of the Sixteenth Century and Their Attitude Toward Religious Tolerance. (Under the direction of M. B. GARRETT.)

The exact origin of the religious sect called the Anabaptists has always been a question of surmise. They seem to have sprung up about the same time in various countries—Switzerland, Germany, and Holland—during the early Reformation period. They wanted to carry on the Reformation program much farther than Zwingli and Luther were carrying it. Because of similarities to certain mediaeval sects, a number of historians have said they had their origin in the Middle Ages. Various groups of Anabaptists emphasized different tenets, but the majority of them believed in the following doctrines: (1) the recognition of the Bible as sole authority for Christians, and the right to individual interpretation; (2) the membership of a church composed only of baptized believers; (3) the rejection of infant baptism; (4) the separation of Church and State. Other practices that were generally adopted were nonresistance and the refusal to take oaths or any part in the magistracy. Persecution only served to multiply the sect. Certain fanatics led some of the Anabaptists in northwestern Germany and Holland to chiliastic extremes, which ended in the catastrophe at Münster. Afterwards the remnants of the Anabaptists were organized into a quiet, useful sect by Menno Simons. The study shows that the Anabaptists anticipated by three hundred years the great principles of the twentieth century.

GEORGE FLOYD TAYLOR. Calvinism of the Sixteenth Century Compared with Lutheranism and Zwinglianism. (Under the direction of M. B. GARRETT.)

Calvinism was one of the three leading creeds of the sixteenth century, the other two being Lutheranism and Zwinglianism; and of the three Calvinism may be taken as the norm with which the other two may be compared. So far as the writer of this thesis has been able to discover, such a comparison

of extended length has not been made before. All the three great Protestant Reformers were aiming at the same thing, but they differed widely in their personalities, in their dispositions, and in their methods of approach toward the common end. In this thesis the original writings of Calvin, of Luther, and of Zwingli, as touching the main points in their creeds, have been brought together and carefully compared and contrasted. On every important point of doctrine, each one speaks for himself, so that Lutheranism and Zwinglianism here appear, point by point, in comparison and contrast with Calvinism.

John Albert Lang. The Movement for a National University, 1787-1829. (Under the direction of F. M. Green.)

The movement for a national university in the United States had its beginnings in the general movement, coming out of the American Revolution, to improve the country's educational and cultural standards. It was thought that the success of the republican form of government depended to a large degree upon an "enlightened" citizenry. Many statesmen and educators looked upon the establishment of a national university as one of the best means of providing for the proper educational facilities for the people. Soon after the establishment of a strong federal government the university proponents began to urge Congress to establish a national university at the capital. Congress having failed to take any action on this proposition, the university advocates proceeded to solicit private funds for the establishment in Washington of educational institutions with a national influence. George Washington University and the Smithsonian Institution of today are the result of their endeavors.

Gustie Yarborough. The Rise and Decline of the Anti-Masonic Party. (Under the direction of Fletcher M. Green.)

This is a study of one of the strangest and most remarkable episodes in the political history of the United States. The party sprang from no special theory of government nor from any novel interpretation of the Constitution, but was built upon hostility to secret societies in general and the Masonic Fraternity in particular.

The party had its origin in the period of political ferment which produced Jacksonian Democracy. The people were then divided into various factions; each of the sections held to its peculiar social ideals; the masses were contending against the classes; and these differences were intensified by social, religious, and economic upheaval. All of these contributed to the growth of the party.

This study investigates and analyzes the factors involved in the rise and fall of the party, and evaluates, so far as possible, its contributions to American political development. The most important of these contributions are found to be the national nominating conventions, the party platform, and the germ of the Whig Party.

THE SCHOOL OF LAW

CHARLES T. MCCORMICK has published during the year:

Fees and Other Expenses of Litigation as an Element of Damages, XV *Minnesota Law Review* 619.

Interest as Damages, IX *North Carolina Law Review* 237.

Liquidated Damages, XVII *Virginia Law Review* 103.

Avoiding Injurious Consequences, XXXVII *West Virginia Law Quarterly* (June, 1931).

PROFESSOR MCCORMICK has collaborated with JAMES H. CHADBOURN on an article entitled The Parole Evidence Rule in North Carolina, IX *North Carolina Law Review* 151.

M. T. VAN HECKE has published:

Four Suggested Improvements in the North Carolina Legislative Process, IX *North Carolina Law Review* 1.

(With J. G. EDWARDS.) Purchase Money Resulting Trusts in North Carolina, IX *North Carolina Law Review* 177.

(With E. M. PERKINS.) Statutory Modification of Consideration, IX *North Carolina Law Review* 196.

He has written the introduction to McCracken's *Strike Injunctions in the New South.* Chapel Hill: University of North Carolina Press. 1931.

PROFESSOR VAN HECKE has the following research in progress:

North Carolina Annotations to the Restatement of Contracts (to be published in book form in the summer of 1931, now in press).

A Treatise on Injunctions.

M. S. BRECKENRIDGE has published during the year:

Tax Escape by Manipulations of Holding Company, IX *North Carolina Law Review* 189.

Report on the Constitutional Powers of Congress to Regulate Railroad Holding Companies, published pursuant to House Resolution 114 as the legal section of *House Report No. 2789,* 71st Congress, third session.

FRED B. MCCALL, with the assistance of MISS NAOMI ALEXANDER, research assistant in the School of Law, has during the past year made

an investigation of the operation in the United States of the Torrens System for the registration of land titles. An article thereon is to be published in the autumn issue of the *North Carolina Law Review.*

The following articles are the composite work of all of the members of the law faculty with the coöperation of PROFESSORS H. D. WOLF, of the Department of Economics, W. S. JENKINS, of the Department of Government, and C. K. BROWN, of Davidson College.

Proposals for Legislation in North Carolina, IX *North Carolina Law Review* 13.

This article formulated detailed proposals for new legislation in the fields of banking, trusts, civil procedure, courts, criminal law and procedure, evidence, motor vehicles, and property. Several of the proposed statutes were enacted by the legislature.

A Survey of Statutory Changes in North Carolina in 1931, IX *North Carolina Law Review* 347.

This article describes and comments on the important new legislation of 1931.

DEPARTMENT OF MATHEMATICS

J. W. LASLEY, JR., has published:

Panosculating Conics of a Plane Curve. *Bulletin of the American Mathematical Society,* XXXVLI: 76. 1931.

The following master's theses were accepted by the Department during the year:

LOUISE ADAMS. Methods of Finding and Solving the Differential Equation whose Envelope is any Four Straight Lines. (Under the direction of ARCHIBALD HENDERSON.)

In this paper an attempt is made to study the derivation and solution of differential equations whose envelopes are composed of four straight lines.

Six different types of envelopes, each composed of four straight lines, are discussed here. In each case a substitution which would reduce the differential equation to one of Clairaut's is obtained. These substitutions are of three types and enable us to solve any differential equation whose envelope is composed of four lines.

FANNIE MAE ANGE. Circles Connected with a Triangle. (Under the direction of ARCHIBALD HENDERSON.)

This thesis is an analytical study of some circles connected with a triangle and some of the propositions related to these circles. The same general triangle of reference is used throughout the paper.

DEPARTMENT OF PHARMACOLOGY

WILLIAM DEB. MACNIDER has completed the following papers during the year:

Concerning the Toxic Action of the General Anaesthetics, Exclusive of the Central Nervous System. *Southern Medicine and Surgery,* XCII: 12. December, 1930.

The Morphological Basis for Certain Tissue Resistance. *Science,* LXXIII: 103. 1931.

Urine Formation. A monograph in process of publication by D. Appleton and Company.

PROFESSOR MACNIDER has the following problems under investigation:

The insulin-like action of white snake root.

The morphological basis for certain types of tissue resistance.

The histology of the kidney in *Protopterus ethiopicus, Polypterus senegalus,* and *Periopthalmus kohlreuteri.* (Aided by the Laura Spelman Rockefeller Grant for Research.)

SCHOOL OF PHARMACY

M. L. JACOBS has the following research in progress:

A comparative study of natural and synthetic camphor in pharmaceutical preparations.

A comparative study of the adsorptive powers of activated carbons and animal chars.

A better laboratory method for the preparation of acetylsalicylic acid.

DEPARTMENT OF PHILOSOPHY

The following doctoral dissertation was accepted by the Department during the year:

PETER ARCHIBALD CARMICHAEL. The Nature of Freedom. (Under the direction of H. H. WILLIAMS.)

Starting from the principle of non-contradiction, or of identity, to which is reduced the principle of sufficient reason and hence causation, a logico-metaphysical inquiry into universality and relation is made, which leads to the conclusion that these two metaphysical concepts are elaborations of the

starting principle itself. Individuality is then investigated, and it is found that by virtue of its relations it is in all respects universal. Then follows an examination of the idea of free will, which is found to reduce to the idea of chance and to involve a breach in causal nexus, both of which are judged to be contrary to the principle of identity and so to lie outside of rational apprehension. It is also found that the indeterministic doctrine of future ambiguity involves a like violation of the fundamental principle of understanding, and this is in turn rejected. Freedom as such is then considered, and the problem of freedom is seen to be the problem of being. Special attention is given to the views that freedom consists in independence, in harmonization of the individual with his world, and in knowledge. Independence is rejected, since it has previously been found that because of its manifold relations with other things no one thing is independent. Harmonization is likewise rejected, as it is shown to postulate what it would prove. Knowledge, taken as understanding, is considered in the light of the root principle of understanding, which, as already stated, is found to be the principle of identity; and it is concluded that this principle, being the means both of discursive knowing and of immediate apprehension of reality, is a vehicle of increasing apprehension of the identification of the self with the universal, or with being as such, which is found to be the broadest sense in which men are free.

The following master's theses were accepted by the Department during the year:

OLIVIA HART CHAMBERLAIN. A Study of John Dewey's Logical Reconstruction. (Under the direction of H. H. WILLIAMS.)

A statement of John Dewey's reconstruction of logic followed by a criticism of his pragmatic logic.

JOHN MORGAN CHEEK. The Religion of Ancient India. (Under the direction of H. H. WILLIAMS.)

Western culture finds in the East illustration, not to say foundation, of European thought, religion, and philosophy. The religion of Ancient India discloses four clearly differentiated stages of growth: (1) the age of the Vedas (from the worship of deified natural forces to the conception of God); (2) the Brahmanic era (from the development of the ritualistic religion of the Brahmanas to the highly metaphysical doctrine of the Upanishads); (3) the epoch of revolt, Buddha and Buddhism (the recoil upon subjective religion); and (4) the Neo-Brahmanic revival (the synthesis of the preceding movements and the basis of the religious faiths of India today). In grandeur of religious ideas the Vedic seers mount to the level of Hebraic thought.

CHARLES A. MADDRY. Kant's Conception of Causality: an Interpretation. (Under the direction of S. A. EMERY.)

The problems of causality by necessity and causality from freedom involve much of Kant's *Critique of Pure Reason, Metaphysic of Morals,* and *Critique*

of Practical Reason. An understanding of Kant is essential to the understanding of these problems, for on them hang the possibilities of knowledge and morality. How knowledge may be had, not of a world of appearances, but of a world of reality necessarily connected and given to us through the functions of a mind equipped with the ability to synthesize phenomena, was the first problem. To harmonize the concept of free moral action with this world of necessarily connected phenomena was the second.

DEPARTMENT OF PHYSICS

OTTO STUHLMAN directed publication of the following article:

OTTO STUHLMAN, JR., and M. D. WHITAKER. High Frequency Electrodeless Discharge Characteristics. *The Review of Scientific Instruments,* I: 12. December, 1930.

Abstract in *Research in Progress,* 1929-1930, p. 59.

He read the following papers:

A Thermionic Megger with Linear Scale. Read before the Elisha Mitchell Scientific Society, January, 1931. Published in the *Journal of the Franklin Institute,* CCXI: 5. May, 1931.

The second positive slope of the characteristics of radiotrons operating on the dynatron principle was investigated for linearity. The linearity found for a limited current plate-filament region was used. Its change in slope varied directly with the external resistance of the plate-filament circuit. It was found that when a megohm resistance was introduced in the plate-galvanometer circuit, a voltmeter possessing a linear scale placed across the plate-filament connections could be converted into a direct reading linear megohm scale.

OTTO STUHLMAN, JR., and HENRY ZURBURG. Electrodeless Discharge Characteristics of Hydrogen and Nitrogen. Read at the Washington Meeting of the American Physical Society, April 30, 1931. (See also abstract of master's thesis of H. ZURBURG.)

Electrodeless glow discharges were obtained by means of a predominant electrostatic field in a spherical bulb placed in a long solenoid excited by undamped high frequency oscillations. Critical minimum potentials to strike the glow discharge were obtained as a function of gas pressure for frequencies between 1.5 and 4.5 million cycles. The characteristics conformed closely to Pashan's law. The critical points defined by the minimum values of X_m and p_m for a given frequency of excitation showed that the Log $(X/p)_m$ was a linear function of the frequency f, between discontinuities, interpreted as critical points of ionization. These critical ionization points were found to be interpretable as arising through successive impacts. The results show that here as in Townsend's work at higher pressures X/p increases with decreases in p. X_m was found to decrease with increase in f except where the relation

passed periodically through sharp maxima, indicating by their shapes differences in elasticity of impact in the two gases, nitrogen behaving like an inelastic gas and hydrogen like an elastic gas. Pressure-frequency relations indicated the existence of the same ionization discontinuities.

OTTO STUHLMAN, JR., and C. J. CRAVEN. The Motion of Bursting Bubbles Rising Through Liquids. Read at the Washington Meeting of the American Physical Society, April 30, 1931.

Small bubbles of gas rising through a liquid at various depths, great compared to their dimensions, arrive along a spiral path at the surface with the same terminal velocity. They roll under the surface film, come to rest and burst, projecting fragments of liquid into the air. These fragments rise to different heights. For a given radius of bubble, temperature remaining constant, the separate fragments follow a near Maxwellian distribution, when distribution in height is examined as a function of diameter of bubble. After the maximum height is passed the above distribution becomes less regular, probably due to distortion in shape of the larger bubbles or changes in surface tension.

Bubbles rising through water at 21° C., having diameters up to 0.16 cm., burst, ejecting three fragments; from 0.16 to 0.20 cm. they burst, ejecting two fragments. Bubbles larger than this burst irregularly.

The Theory of Electrodeless Discharge at Low Pressures. Read before the North Carolina Academy of Science Meeting, Physics Section, Raleigh, May 9, 1931.

The mathematical analysis proposed showed that in the glow discharge, if excited by a high frequency electrical field conforming to a harmonic function, the minimum pressure and potential at which a glow discharge took place can be expressed in the form of the following hyperbolic relation

$$X = \frac{V}{L} + \frac{Ln^2 \pi^2}{2\, e/m}$$

where X is the field strength in volts per cm., V the critical ionization potential of the gas, L the mean free path of the oscillating electron in the gas, n the frequency of oscillation of the electron of charge e and mass m.

The minimum critical potential necessary to excite the gas to glow discharge can be shown to be equal to $X = 2a\ Vp$, where p is the critical pressure at which the glow discharge forms. Introducing the mean free path of the electron in the gas under consideration, if $b = 1$, ionization takes place at a single collision. Θ is the absolute temperature and η the coefficient of viscosity of the gas.

$$\frac{X}{p} = \frac{b\,V}{6.43\,\eta} \sqrt{\frac{m}{\Theta}}$$

Comparing the results thus obtained with the known values of the terminal energies, U, as obtained from the gas kinetic theory, a good check is obtained. The following table indicates typical results:

Gas	$\eta \times 10^6$	V	U	Per Cent Difference
He	187.3	$5.082 \frac{x}{p}$	$5.30 \frac{x}{p}$	4.1
A	209.6	$5.688 \frac{x}{p}$	$5.86 \frac{x}{p}$	2.9
H_2	84.11	$2.394 \frac{x}{p}$	$2.40 \frac{x}{p}$	0.4
N_2	167.0	$4.532 \frac{x}{p}$	$4.65 \frac{x}{p}$	2.6
CO_2	137.5	$3.731 \frac{x}{p}$	$3.88 \frac{x}{p}$	4.0

V values show the terminal energy as computed from the above relations, U values as obtained by Loeb (*Kinetic Theory of Gases,* p. 501, 1927).

PROFESSOR STUHLMAN has the following studies under way:

Intensity Distribution in the Electrodeless Spectra of Gases.

Effect of Changes in Concentration of Electrolytes and Surface Tension on Splashing.

(With G. KOEHL.) Electrification Produced by Friction Between Solids and Gases.

KARL H. FUSSLER read the following paper:

KARL H. FUSSLER and MELVIN A. HETLAND. The Electrical Resistance of the Human Body. Read before the Elisha Mitchell Scientific Society, December, 1930, and before the North Carolina Academy of Science, May, 1931.

A potentiometer method, with a Leeds and Northrup Type K potentiometer, was used. The direct current sent through the body was measured simultaneously with the difference of potentials across the parts under experimentation. The method eliminated the large contact resistances which have vitiated the work of many previous investigators.

The results of the present investigation show that, for the individuals measured, the resistance from hand to hand ranges for the various individuals from 262 to 543 ohms, but is constant for a given individual on a given day.

It varies slightly from day to day. From foot to foot the range is 209 to 400 ohms and the trunk resistance lies between 18.4 and 28.2 ohms.

The resistance does not vary with voltage, current, time of current flow, and electrolyte used to make contacts. It is affected by flexing of muscles, position of the body, and anger.

The following master's theses were accepted by the Department during the year:

HARRY BUTLER MULKEY. The Effect of External Resistance on the Characteristics of a Dynatron. (Under the direction of OTTO STUHLMAN, JR.)

A high external resistance varying from 0.10 to 1.00 megohm was inserted in the plate-filament circuit of a dynatron. The plate current was plotted as a function of the plate-filament potential. The second positive phase of the curves was found to be linear between certain current limits. All tangents to the curves between the current limits had a common voltage intercept. Ohm's law was obeyed for any external resistance inserted in the circuit, provided the above current limitations were used. The change in slope of the curves was plotted as a function of the external resistance. The linear relation developed was calculated from the data using the method of least squares; the intercept of the line was comparable to the resistance of the circuit, less the inserted resistance. Using the expression for the linear relation in connection with a standard megohm inserted in the circuit, the resistance of commercial megohm resistances in the form of grid leaks could be measured, utilizing the electrical set-up as a megohm-meter.

HENRY ZURBURG. Characteristics of the Electrodeless Discharge in Nitrogen and Hydrogen. (Under the direction of OTTO STUHLMAN, JR.) Read before the North Carolina Academy of Science, Physics Section, May 9, 1931.

The electrodeless glow discharge in a spherical bulb placed in a solenoid was obtained by a predominate electrostatic field set up by an undamped high frequency oscillation. The characteristics of the discharge are similar to those studied by Paschan. The sustaining current-pressure relationships also show critical values, and the ratio of the initiating current to the sustaining current was found to have a mean ratio of 2:1. Discontinuities were observed at recurring intervals in the pressure-frequency relationship and may be explained by successive impacts. No conclusions were drawn from the potential-pressure and the potential-frequency relationships because the values of the field strength were not sufficiently consistent.

P. E. SHEARIN. The Relation Between the Intensity and Position of the Overtones of Some Organic Liquids. (Under the direction of E. K. PLYLER.) Published in the *Physical Review,* XXXV: 973. 1930.

A theoretical study of the intensity relations of the overtones of some organic liquids has been made with a view of determining whether there exists a relation between the intensity and position of overtones. A brief summary of some of the work that has been done by other observers is included. By the graphical method the intensities of the first and second overtones of some liquids were measured. These results, together with the ratio of the intensities of the first and second overtones and also a list of the products of this ratio times the correction factor, x, are given in a table. Values are also listed for three diatomic gases, the intensities having been obtained by other observers, the ratio of these intensities times the correction factor being calculated in this work. For both the liquids and the gases the product of the ratio of the intensities of the first and second overtones and the correction factor, x, is of the same order of magnitude and, in consideration of the errors involved, appears to be constant.

DEPARTMENT OF PSYCHOLOGY

J. F. DASHIELL and A. G. BAYROFF have published:

A Forward-Going Tendency in Maze Running. *Journal of Comparative Psychology,* XI, June, 1931.

In multiple-U mazes white rats were found to run the true path more easily when the blinds were located on a constant side than when located alternately right and left. This phenomenon was examined by a variety of mazes in a series of experiments: (1) by adding new segments to the mazes after they had been learned, (2) by building the mazes on scales both larger and smaller, (3) by making motion picture analyses of the animals' behavior, and (4) by trying out a straightaway with an elbow of varying lengths leading to a simple forward- or backward-turning choice. Different hypothetical explanations were canvassed. It seems likely that the factor most responsible is a forward-going tendency in an animal's locomotion that leads to maintenance of a direction in which it is set and also a compensatory correction when forced out of line by an obstruction. This is consonant with the results of several other studies.

PROFESSOR DASHIELL has been conducting an experimental study on Legal Rules of Evidence as a Neglected Experimental Field.

The Aussage experimental technique was adapted to the problem of measuring the rate of decrement in scope and in accuracy of testimony with re-tellings of the evidence by a chain of narrators. Evidence so far obtained supports the legal stricture upon hearsay evidence on account of its weakness under cross-examination.

ENGLISH BAGBY has published during the year:

Dreams During Periods of Emotional Stress. *Journal of Abnormal and Social Psychology,* XXV: 3: 289-292. 1930.

An attempt to show that dreams may be motivated by, and may derive their content from, unsolved problems existing in the current life of the dreamer. Emphasis is placed on worries incidental to a prolonged marriage-engagement.

RUTH HAMILL (MRS. STANLEY PRESTON) has published:

Sequence of Turns versus Distances as Essential Pattern-Elements in the Maze Problem. *Journal of Comparative Psychology,* XI: 367-382. 1931.

White rats were trained in a multiple-T maze; then half of them were re-trained in another maze identical with the first except that the sequence of turns was reversed from *lrrllrl* to *rllrrlr,* while the others were re-trained in a maze identical with the first except for a greater length of the alleys. Of the two groups, the latter learned their new problem much more promptly and with less interference effects. It was concluded that the length of runways was much less important than sequence of turns; also that the conception of a habit as being a concatenation of chained reflexes is quite untenable.

The following doctoral dissertations were accepted by the Department during the year:

A. G. BAYROFF. The Effect of Varying and Stable Environments on Behavior in the Direction Test Box. (Under the direction of J. F. DASHIELL.)

To investigate the problem of direction orientation in white rats, separated as much as possible from problems of elimination of errors, fixation of specific pathways, etc., a series of experimental situations was devised. The first two are reported here. The question considered was the effect of varying and stable environment on behavior in the direction test box. Two groups of animals were used, one for the changing and the other for the stable environment. Both were given identical preliminary training designed to avoid establishment of orientations in response to various features of the environment and to prepare them for handling. The animals were then trained to avoid the right of two alleys extending in the same direction and separated from each other by a distance of four inches, and to enter the left, at the end of which they were allowed to feed. After this habit was well established, the left alley was blocked so that the animals had to return out of it and to enter either the right alley which they had been trained to avoid or a third newly built alley extending in a direction at right angles to that of the original two alleys. The animals were allowed to fixate a new pathway and at the same time were being re-trained to the original situation to avoid lapsing of any direction tendency which might have been established. Both groups fixated the third alley, demonstrating that under the conditions of the experiment mere consonance of direction was not enough to cause entry into an alley, and that the spatial cues provided by a constant environment were not enough to establish a preference for such an alley when other factors are present. Experimental controls for these other factors are projected.

GRAHAM BENNETT DIMMICK. The Effects of Certain Distracting Conditions upon Habit Integration. (Under the direction of J. F. DASHIELL.)

This investigation seeks to make an experimental determination of the effects of certain distracting conditions upon efficiency of performance in a complex habit which involved the integration of two elementary constituent habits. The constituent habits, whose integration resulted in the complex habit, were automatized through practice until additional practices produced no marked fluctuations in their efficiency. Twenty subjects practiced each of the elementary habits daily until the physiological limit of performance was approximated. The subjects were subsequently paired upon the basis of their performance and divided into experimental and control units. Seven of the subjects practiced the complex habit simultaneously with their practice of the simple habits and constituted a separate group, which was likewise divided into an experimental and a control unit. Following the division of the subjects into experimental and control units, practice of habit C, the complex habit, was begun and practice of the elementary constituent habits was continued. The control units practiced the integration of the elementary habits as well as each of these habits independently under normal conditions, while the experimental units practiced the same tasks in the same order under the following distracting conditions: (1) fasting produced by 24 hours' deprivation of food; (2) sleep deprivation of 3 hours' duration; (3) sleep deprivation of 24 hours' duration; (4) continuous a-rythmic auditory stimulation of constant intensity.

The criteria of efficiency of performance utilized throughout this investigation were: (1) a time score; (2) a variability score; (3) an error score. Determination of the effects of the distracting conditions upon each of the elementary habits was made by a comparison with the performance on these habits under normal conditions. The effect of the distracting conditions upon habit integration was ascertained by a comparison of the performances of the experimental and control units.

The results of this investigation indicate that: (1) The effect of the distractions upon the integrative processes is greater than the effect of the distractions upon either of the constituent elements. (2) Practice in the complex habit operates to reduce the loss in efficiency which this habit undergoes under the distractions. (3) Practice in the constituent habits does not operate to increase facility in the integration of these. (4) The distractions used operated to reduce efficiency in the elementary habits which had been practiced until the physiological limit of performance had been approximated. (5) The deterioration under distraction of two equally practiced simple habits is approximately equal. (6) The order of the learning of the component elements of a complex habit, if they are approximately equal, has no effect upon the efficiency decrements suffered by the complex habit under the distractions used. (7) The types of distractions used exercised a differential effect upon the simple habits and upon the integrative processes. The order of their effectiveness in producing efficiency decrements was (a) auditory distraction; (b) 24 hours' sleep depri-

vation; (c) 24 hours' deprivation of food; (d) 3 hours' sleep deprivation. (8) Efficiency in either the simple or the complex habit under normal conditions is positively correlated with efficiency under the distracting conditions. (9) Significant correlations between decrements in efficiency under distraction and intelligence as measured by the Stanford Revision of the Binet-Simon Test were not found.

WILLIAM DARBY GLENN, JR. The Fehlers, a Social and Psychometric Study of a Cacogenic Family. (Under the direction of H. W. CRANE.)

A study of six generations of a defective strain. Data were obtained on a total of 472 individuals of which 128 were consorts. A thorough economic and social history of the individual members of the family was secured, and the Stanford Revision of the Binet was given to 114 of these individuals. Photographs of the majority of the cases tested were obtained. The major problem of the study was that of the inheritance of the degree of defectiveness. The use of the objective test furnished more reliable data on this question than have hitherto been obtained. The results from the tests show a rise in the mean I. Q. of successive generations. An analysis of these results with reference to the introduction of outblood, difference in chronological ages, and the difference in environment during the developmental period supports the conclusion that the degree of defect in offspring is determined to a great extent by the degree of defect in intelligence of the parents of the offspring.

The use of the objective measures in this study serves as a check on the method of somewhat similar work in which data on the economic and social status were used as the sole criterion for determining mental deficiency. A close correlation was found to exist between the level of the economic and social adjustment and the degree of deficiency as measured by the Stanford Revision of the Binet. An analysis of individual cases indicates that there is a causal interrelation between the degree of deficiency, economic status, and social traits. This interrelation was apparent in the selection of consorts who were found to be of equal degree of defectiveness; it was also apparent in that the incidence of anti-social behavior became more frequent with the increase in the degree of mental deficiency. The body of data collected furnished evidence on additional problems in the social aspect of mental deficiency. Fertility in this family, as in other defective strains, was high. There was an average of 7.47 offspring in completed matings and 4.49 offspring for all fertile matings. There was a high incidence of illegitimacy, delinquency, sexual offenses, institutional cases, infant deaths, intermarriages, and stillbirths in the strain. The frequency of the first four of these factors increased with the degree of defect.

J. H. MCFADDEN. Differential Responses of Normal and Feeble-Minded Subjects of Equal Mental Age, on the Kent-Rosanoff Free Association Test and the Stanford Revision of the Binet-Simon Intelligence Test. (Under the direction of H. W. CRANE.)

In this study 529 subjects were tested with the Stanford Revision of the Binet-Simon Intelligence Test; 507 were given the Kent-Rosanoff Free Association Test and, in turn, 232 of these 507 were given the Stanford Achievement Test. The purpose of the study was to record differences in the responses of normal and feeble-minded of equal mental age. Mental age is defined as the sum of the credits earned on the Stanford-Binet; intelligence quotient is the mental age divided by the chronological age; normal refers to subjects with I. Q.'s of 90 or over; feeble-minded refers to subjects with I. Q.'s of 70 or under. Four mental age groups are included in this study, the mental ages being 6, 7, 8, and 9. Each M. A. group includes two brightness or I. Q. groups (normal and feeble-minded) of approximately 50 subjects each. Thus the normals with mental age of 6 are compared with feeble-minded with mental age of 6; normals with M. A. of 7 with feeble-minded with M. A. of 7, etc.

In general, normals and feeble-minded of a given M. A. resembled each other in their responses, and differed from normals or feeble-minded of other M. A.'s. In particular, on the Kent-Rosanoff Test, the feeble-minded tended to give more phrases (the directions call for one-word responses) than did the normals of equal M. A., and the normals tended to give no response (or a failure of response) more frequently than did feeble-minded of equal M. A. The writer attributes this largely to the result of early conditioning and social pressure, and also to a greater familiarity with commonly used words on the part of the (chronologically) older feeble-minded. On the Stanford-Binet, for normals and feeble-minded alike, certain of the sub-tests seem too easy and others seem too difficult for the year-level in which they are placed. As differentiating between normals and feeble-minded of equal M. A., the normals in general seem to surpass the feeble-minded in those sub-tests calling for ingenuity and manipulation of the materials, but the feeble-minded seem to surpass the normals in those sub-tests calling for the effects of repeated drill or training. These categories are loose and overlap to some extent. The feeble-minded definitely surpass the normal in their scores on the vocabulary test (within the limits of this study, which does not include the more abstract or less familiar words) when the quality of the response is not graded differentially. The feeble-minded show a slightly greater variability on the Stanford-Binet than do the normal of equal mental age.

JAMES R. PATRICK. The Effect of Emotional Excitement on Rational Behavior as Demonstrated by the Quadruple-Choice Method. (Under the direction of J. F. DASHIELL.)

The apparatus for this investigation consists of a room-like enclosure with one entrance and four exit doors. The entrance door closes and locks itself after the subject has entered. Of the four exit doors only one is unlocked on any given trial and the subject is to find out, in a trial-and-error fashion, which is the unlocked door and thereby gain exit through it. The unlocked door varies from trial to trial. The *rational principle* is manifested by human subjects when they show by their behavior that they take cognizance of this *ever-varying unlocked-door-principle.* Under non-emotion-exciting conditions nor-

mal adult university students, when put through the apparatus for 100 trials each, show a preponderance of type A reaction, which is the rational inference principle objectively classified. The data when classified reveal five objectively classifiable reaction tendencies, namely, A, B, C, D, and E types, the highest type being A and the lowest E in order of descent. The last named (type E) was most frequently found by another investigator, G. V. Hamilton, to be present in a child and in lower mammalian life, as cats, dogs, and monkeys. After establishing experimentally with normal adult human beings the classifiable reactions given above, the writer then introduced emotion-exciting stimuli such as "electric shock," a "cold shower," and a "loud blast" of a horn (one stimulus at a time during any given trial) and the same subjects were put through the apparatus again for 100 trials each with only the added element of the emotion-exciting stimulus present. It was shown that when normal adult human beings are confronted with an ever-varying-situation for which they have no definite mode of adjustment (habit) already established and yet are required to find their way out of the situation, under emotion-exciting conditions their behavior drops from a *rational* level to that of an *infantile* level. This means, of course, that under normal conditions the subjects gave a preponderance of type A reactions, while under emotion-exciting conditions they gave a preponderance of type E reactions, the lowest of all classifiable reactions.

DEPARTMENT OF ROMANCE LANGUAGES

William M. Dey has published an article entitled A Note on Stendhal and Victor Hugo. *Studies in Philology,* XXVIII: 4. 1931.

Professor Dey has in preparation other articles dealing with Stendhal and the literature of his time.

Sturgis E. Leavitt has published:

Apples of Hesperides Again. *Modern Language Notes,* XLVI: 33-34.

Latin-American Literature in the United States. *Revue de Littérature Comparée,* XI: 126-148.

The Estrella De Sevilla and Claramonte. Cambridge: Harvard University Press. 1931.

Sources and date of the play, discussion of the question of interpolations, life and works of Claramonte, discussion of the possibility that Claramonte was actually the author of the *Estrella de Sevilla.*

He has in preparation:

Latin American Literature in the United States. A bibliography of translation and criticism.

PROFESSOR LEAVITT presented the following papers:

Sources and Date of the *Estrella de Sevilla.* Read before the South Atlantic Modern Language Association, November, 1930.

The *Estrella de Sevilla* and Andrés de Claramonte. Read before the Modern Language Association, December, 1930.

Latin American Literature in the United States. Read before the Philological Club, January 13, 1931.

(For abstract see page 98.)

U. T. HOLMES, JR., has published:

A Study in Negro Onomastics. *American Speech,* V: 463-467.

French *gnaf,* Scottish *nyaff. Studies in Philology,* XXVIII: 569-573.

Old French Yonec. *Modern Philology,* VII: 194-199.

He has completed for publication:

(With J. C. LYONS.) The Works of Guillaume de Salluste, Sieur du Bartas, Vol. I. To be issued by the University of North Carolina Press.

Germanic Influence on Old French Syntax. To appear in *Language.*

Waldensian Speech in North Carolina. To appear in the *Zeitschrift für Romanische Philologie.*

PROFESSOR HOLMES has in preparation:

(With A. H. SCHUTZ of Ohio State University.) A History of the French Language.

(With E. E. ERICSON.) A Bibliography of the Homage Volumes.

N. B. ADAMS has completed:

A Re-adaptation of *Sancho Ortiz de la Roelas. Studies in Philology,* XXVIII: 4. October, 1931.

Hartzenbusch's Reworkings of *Los Amantes de Teruel.* Read before the Spanish Literature Section, Modern Language Association, December, 1930.

H. R. HUSE has published:

The Psychology of Foreign Language Study. Chapel Hill: University of North Carolina Press. 1931. vi, 231 pp.

J. CORIDEN LYONS has completed during the year:

Conceptions of the Republic in French Literature of the Sixteenth Century. *Romanic Review,* XXI: 296-307. 1930.

Notes on Mathurin Régnier's *Macette. Studies in Philology,* XXVIII: 4. October, 1931.

PROFESSOR LYONS has been engaged during the year on the following projects:

(In collaboration with U. T. HOLMES and others.) An edition of the works of Salluste du Bartas. Volume I is now in press.

Further investigation in the field of popular literature in France in the early sixteenth century.

RALPH S. BOGGS has published:

A Selective Bibliography of Dominican Literature. *Bulletin Hispanique,* XXXII: 4. October-December, 1930.

He has read the following papers:

Problems in Folktale Classification. Read before the Popular Literature Section, Modern Language Association, Washington, D. C., December, 1930.

The Folktale of the Halfchick. Read before the North Carolina Folklore Society, Raleigh, N. C., December, 1930.

PROFESSOR BOGGS has in progress:

Old Spanish dictionary project.

A collection of North Carolina folktales.

Folklore in the *Celestina.*

He is directing the following research:

THOMAS EWELL WRIGHT. Index of French Folktales. (For the doctor's degree.)

DAVID FRANKLIN MCDOWELL. Vocabulary of the *Rimado de Palacio.* (For the doctor's degree.)

S. A. STOUDEMIRE has published:

D. Antonio Gil y Zárate's Birth-Date. *Modern Language Notes,* XLVI: 171-172. 1931.

A Spanish Play on the Fair Rosamond Legend. *Studies in Philology,* XXVIII: 4. October, 1931.

The following master's theses were accepted by the Department during the year:

BENJAMIN F. CARPENTER. The Life and Writings of Maistre Wace, an Anglo-Norman Poet of the Twelfth Century. (Under the direction of U. T. HOLMES, JR.)

This study undertakes to collect all the available material on the subject of the poet, Maistre Wace, and his writings, with special emphasis upon the comparative method. The results show that Wace was an important factor in the intellectual activity of his century because: he wrote in the vernacular instead of Latin and thus helped to popularize French as a literary language; he introduced variations in conventional rhyme schemes and was perhaps the first poet to improve upon direct repetition; his extant works throw light upon the stage of development which the French language had attained by the middle of the twelfth century.

Wace made a significant contribution to knowledge of the Norman conquest of England, and of the customs which prevailed in the twelfth century. Finally he served as an important link in the transmission of the Arthurian material from the Latin chronicle of Geoffrey of Monmouth to the chivalric romances of northern France, and added to it by introducing the Round Table.

WALTER DEVEREAUX CREECH, JR. The *Histoires Des Amanz Fortunéz* and the *Heptameron.* (Under the direction of J. CORIDEN LYONS.)

The *Histoires des Amanz Fortunéz,* the first edition of the *nouvelles* which later became known as the *Heptameron,* was published in 1558 by Pierre Boaistuau, and in his work the name of Marguerite D'Angoulême, queen of Navarre, is not mentioned as the author. This fact and the appearance the next year of an altered edition of the stories made by Claude Gruget under the direction of Marguerite's daughter, Jeanne d'Albret, has led scholars to think of the *Amanz Fortunéz* as a scurrilous, inaccurate work, unworthy of the royal authoress, and is no doubt responsible for the theories that Marguerite did not write the stories. In this study of the *nouvelles,* made by checking through the first edition and observing its relations to the Gruget edition of 1559 and the edition of the Société des Bibliophiles of 1853, based on the manuscripts, an attempt has been made to throw light on a little known and much maligned work. A study of the life of Marguerite D'Angoulême is included as a background for the treatment of the *nouvelles.* Some conjectures, based on facts of her life and historical references in the stories themselves, are given as to the disputed authorship and manner of composition. The chief concern, however, is to bring out the differences between the first and later editions. Though the *Histoires des Amanz Fortunéz* offers the stories in a different order from that of the standard editions of the *Heptameron* and contains certain variances in the text, these differences are so minor that they do not merit the derogatory charges made against Boaistuau's work. In fact, Boaistuau is much more

faithful to Marguerite's original manuscript than is Gruget, who suppressed certain of her stories and substituted his own.

CLAIRE JANET DOUGLAS. The Influence on Don Francisco de Rojas' *Obligados y Ofendidos*. (Under the direction of N. B. ADAMS.)

Three French dramatists—Paul Scarron, l'Abbé de Boisrobert, and Thomas Corneille—each presented in 1654 a French comedy in imitation of the play *Obligados y Ofendidos* by Francisco de Rojas. The Spanish play in 1707 furnished Le Sage with the inspiration for an episode in *Le Diable Boiteux*, a novel of character. In 1767 Beaumarchais used the episode as the basis for his first drama, *Eugénie*. This study seeks to show how each subsequent play on the original Spanish theme was influenced by Rojas' drama, and how the plot was colored by the individuality of its author.

L'Écolier de Salamanque ou les Ennemis Généreux was little more than a five-act *refundición* of the original. Scarron did, however, improve the speed of the dialogue. Boisrobert, also, in *Les Généreux Ennemis* followed the Spanish quite closely, but radically changed the motivation for some of the action. Thomas Corneille in *Les Illustres Ennemis* changed the background of the plot and introduced more romanesque elements. In *Le Diable Boiteux* there is a suggestion of character analysis not found in the original play. In *Eugénie* by Beaumarchais the original theme is used, but only as a basis for the psychological analysis of the characters.

The main theme of *Obligados y Ofendidos* gradually develops from an intrigue used merely as the basis for a *comedia de gracioso* into a play with individual characters, in which the development and psychological analysis of human beings, as well as the principles underlying the courses of human action, are the most important elements.

FRANK S. HOWELL. Corneille, Molière, and Racine in Beauchamps' *Recherches sur les Théâtres de France*. (Under the direction of THOMAS J. WILSON, III.)

A careful study has been made of Beauchamps' treatment of the life and works of Corneille, Molière, and Racine in his book, *Recherches sur les Théâtres de France* (Paris, 1735), in order to discuss the treatment given these three dramatists and to point out, by means of comparative references to leading historians, both of Beauchamps' own time and of today, errors that the author has made. Considerations were presented touching the life and works of Beauchamp himself, then a description of his book, observations relative to it, and opinions of authorities as to its merit were given. This was followed by discussion of the treatment of the life and works of Corneille, Molière, and Racine, pointing out in every instance inaccuracies and omissions as they present themselves, by comparing Beauchamps' information with that given by such authorities as the Fréres Parfaict of the eighteenth century, Tascherau, Marty-Laveaux, and Mesnard of the nineteenth, and Rigal and Lancaster of the twentieth. Finally, conclusions are drawn as to Beauchamps'

treatment of the dramatists, and as to the worth of the book as a whole. It was discovered (1) that the section devoted to Corneille is filled with inaccuracies and omissions, there being fifteen absolute errors with regard to dates; (2) that the section devoted to Molière is superior, yet leaves much to be desired, there being also fifteen errors with regard to dates; (3) that the section devoted to Racine is most incomplete, although there are only two actual errors in dates. The work as a whole, as these three sections point out, is unreliable as a reference for the modern scholar. It has, however, a real value in the long lists of authors and plays, for which purpose the book should be used principally.

CHARLES NEAL. The Originality of Vaugelas and his *Remarques sur la Langue Françoise,* 1647. A Preliminary Study. (Under the direction of U. T. HOLMES, JR.)

The main purpose of this study is to attempt to determine to what extent Vaugelas was "un simple tesmoin," to give his own words, and to what extent he was "le législateur du langage" (Auger), or "un des plus sensés régulateurs de notre langue" (Sainte-Beuve). Three types of writers were selected: the courtly, Chapelain and Voiture; conscious literary artists, Malherbe and Balzac; and the popular, Tabarin. From these were chosen passages written as near 1647 as possible and a careful count was made of the constructions contained in twenty-six of Vaugelas's "Remarques," selected on a basis of their importance and their probable frequency of occurrence. An average of 94.6 per cent agreement of the five authors was found with the representative "Remarques" chosen. Ranking them in order, lowest to highest, they are as follows: (1) Tabarin, 82.8 per cent; (2) Malherbe, 89.1 per cent; (3) Chapelain, 95 per cent; (4) Voiture, 97.4 per cent; and (5) Balzac, 97.5 per cent. Two figures seem especially significant: first, the 89.1 per cent agreement in the case of Malherbe, who died in 1628, nineteen years before the publication of the *Remarques;* second, the 82.2 per cent agreement in the case of Tabarin. Not only does he represent the popular, even the low speech, but he, too, lived a number of years prior to 1647, the publication date of the *Remarques.* From these figures it seems safe to conclude that as far as these particular "Remarques" and these particular authors are concerned, Vaugelas was decidedly only a recorder; and, furthermore, since both the "Remarques" and the authors are representative, one can venture to say that French grammar and style were on a conscious upward trend and that whatever may be his influence on following generations, Vaugelas's contribution to this development must be considered only that of codification.

DOROTHY PHILLIPS NEAL. The Social Drama of Manuel Linares Rivas. (Under the direction of S. E. LEAVITT.)

This thesis is a study of the social plays of Manuel Linares Rivas, one of the principal dramatists of modern Spain. It does not include his most recent dramas or his novels, and his non-social plays are considered only briefly.

His social drama has been carefully examined with particular reference to purpose, dramatic technique, and philosophy. The results of the study were compared with the opinions of contemporary critics, and conclusions were drawn from this comparison. These conclusions are that Linares Rivas has a high social purpose in writing his plays; that he has often resorted to extreme cases and unnatural style to emphasize his problems; that his moralizing is effective and not excessively didactic; and that his philosophy of life is optimistic, sane, and workable.

RUTH HAZEL PEARSON. The Life and Works of Jean François Sarasin. (Under the direction of U. T. HOLMES, JR.)

Jean François Sarasin (1604-54) is a French poet and prose writer of the first half of the seventeenth century, whose career has been unduly neglected in modern times. His life presents several difficulties: (1) the spelling of his name in four different ways; (2) the dispute over the dates of his birth and death; (3) his parentage; (4) the total lack of information regarding his early life, which he spent at Caen. He came to Paris where he identified himself with the *précieux* movement of the Hôtel de Rambouillet. As secretary of the Prince de Conti, he followed him through the Fronde. He died in 1654. In character Sarasin was a typical Norman—cunning, tricky, self-seeking; he was also clever, witty, gallant, and even clownish. His poetical works follow the tendencies of Voiture. His historical works are in clear, methodical style, some of the best pages of history in the seventeenth century. He introduced the Italian burlesque into France and used it very effectively as a means of satire. Although a very facile writer, he never took his ability seriously and produced but little. The sources of inspiration and the editions of his works are treated.

CARRIE MAY STOCKTON. A Historical Survey of Spanish Orthography. (Under the direction of RALPH S. BOGGS.)

This study attempts to present a historical survey of Spanish orthography from its origin to the present. In so far as possible, historic limits for the various orthographic developments have been ascertained. Since orthography is merely a system of symbols to represent sounds and the evolution of orthography depends upon the evolution of sounds, it has been necessary to take into rather detailed account the development of the Spanish sounds in order to understand the orthographic revolution. A survey of the present type has never before been made, and a detailed study of this sort is a *desideratum.*

CECIL GRADY TAYLOR. Satire in Early Fourteenth Century French Literature. (Under the direction of U. T. HOLMES, JR.)

Without discussing the matter of influences and sources, a study has been made of two early fourteenth century monumental French poems, *Renart le Contrefait* and *Le Roman de Fauvel,* for the purpose of noting the objects of their satire and how it related to the time of the reign of Philippe le Bel. A brief historical survey of the period studied is first given, with particular at-

tention to the claims at laxity in the practices of some ecclesiastics, to the independent stand which Philippe IV took before Boniface VIII leading to the "Babylonian Captivity" of the Popes at Avignon, and to the destruction of the Order of the Knights Templars. A rather thorough analysis of the satirical parts of both works studied has been made, and frequent quotations serve to illustrate the tone of the satire and the feeling of the authors in launching it.

Le Roman de Fauvel is the earlier of the two works; *Renart le Contrefait* is by far the more important. Both works are a continuation of literary genres of the thirteenth century. Satire on the clergy and the monks was rather common and almost conventional; that on the nobles in *Fauvel* and in *Renart le Contrefait* seems to be practically original and sincere. The motive for such satire as this last type has been attributed to the authors' discontent with their low social station, to their envy of the life of the clergy and particularly of the nobles, and to the fact that dullness and monotony after active intellectual periods in the twelfth and thirteenth centuries made the spirit of their times repulsive and unbearable to keen minds.

LUCILE VEST. *The Lay of Narcissus.* An Edition. (Under the direction of U. T. HOLMES, JR.)

Four manuscripts of the *Lay de Narcisus* exist. The text of this edition has been established according to manuscript 837 *fonds français* of the Bibliothèque Nationale, which from a study of the hand appears to be the oldest and the best of the existing manuscripts. Variants have been made showing where manuscripts 2168, and 19152 of the Bibliothèque Nationale differ; variants have not been made of the Berlin manuscript because of its incomplete state. In the introduction, the Lay is compared with its source, Ovid's *Metamorphoses* (III. 339-510), a study which reveals that the French poet was indebted to Ovid for his theory of love and a few of the details of the story, but that on the whole his was an original work. An analysis of style, according to the rules of the medieval rhetoricians, and a study of the versification, of the date, and of the editions have also been added.

DEPARTMENT OF RURAL SOCIAL-ECONOMICS

E. C. BRANSON has directed:

Studies in Administrative County Government and County Affairs in South Carolina. Economic-social-civic surveys of six counties (Colleton, Fairfield, Darlington, Aiken, Williamsburg, and Laurens) were made by COLUMBUS ANDREWS, research assistant, directed by E. C. BRANSON for the Institute for Research in Social Science at the University of North Carolina, in collaboration with the University of South Carolina, represented by S. M. DERRICK. These field studies of county government preface a volume on Administrative County

Government and County Affairs in South Carolina as a whole. This volume will be completed and ready for the printers by September 1.

A field survey of Farm Properties and Practices in a colony of forty-seven German families near Ridgeway, N. C., which is under way by RACHAEL CROOK.

Farm Group Activities in the South, by E. C. BRANSON, makes a chapter in *The Country Life of the Nation,* published by the University of North Carolina Press, 1931.

S. H. HOBBS, JR., is serving as directing editor in the preparation of three volumes on adjoining states similar to his *North Carolina: Economic and Social.* (See *Research in Progress* 1929-1930, p. 70.) These volumes are to be published by the University of North Carolina Press. The volumes will appear as follows:

South Carolina: Economic and Social, by S. M. DERRICK, University of South Carolina.

Tennessee: Economic and Social, by C. E. ALLRED, University of Tennessee.

Virginia: Economic and Social, by WILSON GEE, University of Virginia.

PROFESSOR HOBBS has completed a study on The Balance of Trade Against Southern Agriculture. His findings were presented before the Institute on Public Affairs, University of Virginia, July, 1931.

During the year the Department, coöperating with the North Carolina Conference for Social Service, issued the North Carolina Club Yearbook on Agriculture in North Carolina: Resources, Conditions, and Possibilities, edited by S. H. HOBBS, JR.

The Club Yearbook contains the following chapters: Shifting Agriculture, HUGH MACRAE; Land Resources of North Carolina, J. W. HARRELSON; North Carolina as an Agricultural State, S. H. HOBBS, JR.; A Safely Balanced Agriculture as Related to the Retention of Farm Wealth, I. O. SCHAUB; The Necessity for Scientific Agriculture, D. R. COKER; Farm Tenancy: Facts, Results, Remedies, E. C. BRANSON; Standards of Living of North Carolina Farm People, C. C. TAYLOR; Forestry By and For Farmers, R. W. GRAEBER; The Farmers' Federation, J. G. K. MCCLURE; Farmers' Mutual Exchanges, E. W. GAITHER; Farm Commodity Marketing, GEORGE ROSS; Agriculture's Responsibility for Unemployment, G. W. FORSTER; Industry's Responsibility for Unemployment, G. T. SCHWENNING; Operating a Balanced Farm, F. B. LATHAM; Educating for Agricultural Life, OLIVE D. CAMPBELL; Organizing a County for Agriculture, JEAN COLTRANE; An Agricultural Program for North Carolina, O. MAX GARDNER.

PAUL W. WAGER, who was granted leave of absence to direct a study of Forest Taxation in North Carolina for the United States Forest Service, had his leave extended to September, 1931. His research project was reported in *Research in Progress* for 1929-1930, p. 71.

INEZ C. BONEY is making a study of Successful Country Churches in North Carolina (under the direction of S. H. HOBBS, JR.)

The main object of this study is to determine if there are conditions common to all successful country churches.

The following doctoral dissertation was accepted by the Department during the year:

SAMUEL MELANCTHON DERRICK. Economic History of the South Carolina Railroad. (Under the direction of E. C. BRANSON.)

The South Carolina Railroad grew out of the economic needs of South Carolina in general and of Charleston in particular. By the decade 1820-1830 all of South Carolina up country as well as low country had become primarily a cotton producing area. The planters were in need of a cheap means of exchanging the staple for plantation food and feed supplies. Charleston, being the chief export and import market of the state, was naturally greatly interested. Cotton from Piedmont South Carolina was going to Augusta and then down the Savannah River to Savannah. Also the inland towns along the fall line were destroying her retail trade. To correct this condition Charleston merchants and business men built the line from Charleston to Hamburg. During the first ten years of operation the effect of the railroad was disappointing. The chief causes of this failure were the competition of the Savannah River, the hostile attitude of Augusta business interests, and the lack of terminal facilities in Charleston.

Upon the completion of the railroad from Charleston to Hamburg, a movement led by Robert Y. Hayne was begun to build a trunk line from Charleston through central South Carolina, western North Carolina, eastern Tennessee, and central Kentucky to Cincinnati, Ohio, to connect the cotton-producing area of South Carolina with the northwest. Because of the lack of coöperation from the states concerned, the business depression of the late thirties and early forties, and the active opposition of John C. Calhoun, who favored a line through Georgia to Alabama and Mississippi, the idea was abandoned. The only railroad construction completed was a branch from Branchville to Columbia. This road was merged with the road from Charleston to Hamburg in 1843. The new organization—by building a branch to Camden, extending the road across the Savannah River into Augusta, constructing new facilities in Charleston, improving track and rolling stock, and especially by forming connections at Columbia with railroads leading into upper South Carolina—was able to stimulate the business of Charleston. But the invasion of Sherman's army brought disaster to the railroad.

Because of the general economic, social, and political disorganization of the state, together with the competition of other roads in the area, the South Carolina Railroad was forced into bankruptcy in 1878. It was bought by a group of northern capitalists. Northern capitalists had also secured control of connecting lines in the state, and in the interest of northern cities the lines of traffic were directed northward. In this situation the position of the South Carolina Railroad and Charleston obviously was disadvantageous. The railroad was compelled to content itself with local business almost exclusively, and Charleston was simply left off the main lines of traffic. Finally, with the coming of the Southern Railway, it seemed that she would regain her former position. To what extent the Southern Railway has aided the commerce of Charleston is another study. However, the chief lines of traffic in South Carolina move northward.

DEPARTMENT OF SOCIOLOGY

HOWARD W. ODUM has published during the year:

An American Epoch: Southern Portraiture in the National Picture. New York: Henry Holt and Company. 1930. Cloth, xi, 379 pp.

This is a part of several years' research into southern social conditions.

Folk and Regional Conflict as a Field of Sociological Study. *Publications of the American Sociological Society,* XXV: 1. May, 1931.

PROFESSOR ODUM has edited for the American Social Science Series during the year the following:

Sociological Theory and Social Research. By Charles Horton Cooley.
Social Attitudes. By Kimball Young.
The Technique of Social Progress. By Hornell Hart.

PROFESSOR ODUM (with ROY M. BROWN, CLARENCE HEER, and others) prepared for Governor Gardner's Prison Commission a special report on the North Carolina Penal System.

PROFESSOR ODUM is directing the research project, Trends in Public Welfare, a unit in the research of the President's Committee on Social Trends, of which he is assistant director of research.

With KATHARINE JOCHER he is continuing the studies of regional and folk sociology.

ERNEST R. GROVES has in press a revised edition of his book, *Personality and Social Adjustment.* New York: Longmans, Green and Co.

L. L. BERNARD has published during the year the following:

Attitudes and the Re-direction of Behavior. A chapter (pp. 46-74) in *Social Attitudes.* New York: Henry Holt & Co. 1931. x, 382 pp.

Schools of Sociology. *Southwestern Political and Social Science Quarterly,* XI: 11: 34. 1930.

Based on the sources illustrating the chief trends of social philosophy and sociological investigation from the time of the Sophists to the present.

Culture and Environment. *Social Forces,* IX: 39-48. 1930.

Classification of Culture. *Sociology and Social Research,* XV: 209-229. 1931.

An Interpretation of Sociology in the United States. *Publications of the American Sociological Society,* XXV: 43-54. 1931.

W. B. SANDERS has collaborated with GEORGE H. LAWRENCE on a book to be entitled Rural Social Case Records.

This study will include a group of fifteen records of rural cases in Orange County, N. C., covering such public welfare problems as mothers' aid, child placing, juvenile delinquency, feeble-mindedness, illegitimacy, etc., and written in such form as will be of assistance in teaching the technique of social case work.

LEE M. BROOKS has in progress:

(With H. D. MEYER.) A study of Racial-Social Distance among Southern Students of Sociology.

A continuation of the study of Primary Group Isolation with Emphasis on Factors of Social Change.

The following doctoral dissertations were accepted by the Department during the year:

RUTH LINDQUIST. The Family in the Present Social Order. (Under the direction of E. R. GROVES.)

The family of the present day is increasingly dependent upon forces outside the home. These forces affect its unity, the nature of its responsibilities, and its achievements. A study of a selected group of 306 families through a questionnaire has brought out some of their needs. In these homes the development of children, laundering, care of the house, and management of finances are the responsibilities which occasion fatigue, worry, and friction. Among the factors affecting satisfaction and achievement are health, economic security, atti-

tudes and traits of married couples, managerial ability, and the degree of assistance available through the community. Economic problems are increasingly numerous and difficult in the present-day family, and require greater skill if they are to be met.

Education for marriage and parenthood is regarded by the group as desirable for the success of the family. A comparison of the needs of wives and mothers with the courses offered in nine colleges and universities indicates that education for the direction of family life in the past has been primarily in the techniques of homemaking, with emphasis upon good standards in the routine processes carried on in the home. At the present time a transition from processes to persons, particularly the young child, is occurring. A need exists for more emphasis upon personnel of the family, factors promoting successful marriage and family life, use of leisure, and citizenship. If such courses can be made of value to those majoring in other fields, and if prerequisities are few, in a short time education for marriage and parenthood and that for earning will be equally available. Similar backgrounds for men and women would go far in reducing avoidable sources of friction in families.

The number and type of resources available in the community affect the ease with which goals of the family are neared, the time required, and the cost to the individual. In the present study a wide variation is found in the extent to which a community serves its families. The degree to which outside agencies assist is dependent in part upon the demands which groups of families make and the policies they adopt.

JOHN PAUL MCCONNELL. After-Prison Life of Released White Prisoners in North Carolina. (Under the direction of E. R. GROVES.)

In order to secure more reliable data concerning the after-prison life of released white prisoners, this investigation covers the 393 white prisoners who were released from the North Carolina State Prison System during the years 1917 to 1922, inclusive. All available information in the State Prison offices for the entire group was secured. Field investigations were made into 34 representative counties in which 217 of these prisoners were released. Of this representative group 141 were interviewed, and considerable data were secured for the remaining 76 ex-prisoners. The social and physical environment from which these ex-prisoners came was constructed from the data secured. High percentages of occurrence of numerous unfavorable social and environmental factors indicate the social abnormality of this group, and aid in explaining their criminal conduct as well as their after-prison life. These data indicate that a large proportion, certainly three-fourths or more, of this group began their anti-social careers very early in life, and that their after-prison life is only a continuation and extension of pre-prison life.

To present the after-prison life of these ex-prisoners more adequately, the data were further divided and utilized to show their post-prison family life and environment; the operation of the parole system and the attitude of these ex-prisoners towards pardon and parole, as well as the offenses committed by them in violation of the terms of their paroles; unemployment and its effect

as well as the attitude of employers towards their employment; and the unfavorable attitude of the ex-prisoner towards the law. More than nine-tenths of this group of ex-prisoners are living on a marginal or dependent level. Almost two-thirds have committed at least one offense for which they have been tried before the superior courts, while almost half of them have committed two or more offenses since their release. Terms of conditional pardons and paroles were openly violated by 57.5 per cent. Only 2.3 per cent had any form of supervision exercised over them. Among the group investigated, 73.2 per cent have been partial or total failures in readjusting themselves successfully to after-prison life. In general, it was concluded that imprisonment has seemingly had little effect on these ex-prisoners. It has neither reformed them nor deterred them from committing other crimes; it must be considered as only one of the unfavorable factors to which the group was subjected.

ARTHUR FRANKLIN RAPER. Two Rural Black Belt Counties. (Under the direction of E. R. GROVES.)

The sub-title of this study: A Comparative Study of Population Movements, Man-Land Relations, Planes of Living, Institutions and Attitudes in Greene and Macon Counties, Georgia, Including Similar Comparisons by Race in Each County, is a brief outline of the comprehensive picture of the conditions in two Georgia rural black belt counties. Although the two counties were much alike, Greene lost approximately forty per cent of her farmers between 1920 and 1925, while Macon lost almost none.

The general tendency in recent years has been for Negro families to be displaced in these black belt counties by white families from the hill counties of Georgia and Alabama. When the cotton crop of Greene County was reduced to less than ten per cent normal yield by the boll weevil for three consecutive years, hundreds of families left the county. The credit of landlords was exhausted and banks failed. The Negro tenants were affected by this depression more than white tenants. The exodus from Greene County was due largely to the poor cotton crops of 1921, 1922, and 1923. Macon County suffered no population movements from its farms between 1920 and 1925. The cotton crop of Macon County did not fall below sixty per cent normal, except for three years between 1920 and 1927, and no two were consecutive. Greater crop diversification in Macon County does not explain Macon's retention of farm population, for the half of Macon County devoted exclusively to cotton and corn lost no population.

In the study, Negro landownership is dealt with in detail, and scales of living among owners, fixed and share renters, croppers and wage hands. The order given above is true for both races. The annual gross income for rural Negro families in Greene County was less than $400 in 1927; in Macon County, less than $500. The utilization of these small incomes is indicated. Race relations and crime are discussed in detail. Crime among the Negroes appears from this study to be decreasing.

Facts concerning public education are set forth which indicate the differences between educational opportunities of the two races. Churches, lodges,

societies, and the utilization of leisure are described. Finally, fundamental assumptions accepted by both whites and Negroes are fully described, and it is pointed out that the white man is a puny, though self-satisfied dictator, and the Negro a happy, though fatalistic plodder.

MARY PHLEGAR SMITH. Municipal Development in North Carolina, 1665-1930. (Under the direction of H. W. ODUM.)

Efforts to encourage town growth in North Carolina have consisted, since 1665, when the Lords Proprietors of Carolina laid plans for the building of cities, of instructions to the governors that towns be laid out and established; of the adoption of a plan whereby towns of specified size might have special representatives in the general assembly; and of the active efforts of such "realtors" as William Churton and Archibald D. Murphey. In more recent times inducements have taken the form of offering free land to manufacturing plants, and of municipal advertising of various sorts. Formerly the agents were outsiders, in the main, scattered leaders who saw that the economic development of the colony would be hastened with an increased urban population; today they are still, possibly, a limited group, but they are the people *within* the cities and towns.

Geographic factors have been instrumental in causing the North Carolina urbanization program to be late in materializing. The coast line largely closed, the routes of travel feeding into neighboring states rather than into the eastern part of North Carolina itself, have all had their effect. Further the state suffers in that it is located too far north to be a distributing center for the southern states, too far south to serve thus for the border states, and too far east to participate in the trade of the great central plain and its connected valleys. Moreover, the Civil War and Reconstruction, on the whole, gave rise to a form of municipal stagnation.

There has been no special reason for the rapid growth of any great cities in North Carolina. Instead the state shows a normal development, with a consistent but not spectacular urbanization movement. What the industrial expansion has done for the Piedmont, the tourist trade and resorts have done for the mountain municipalities, and the tobacco and cotton markets, trucking, and shipping, for the Coastal Plain towns. This study aims to show (1) the steady growth of cities and towns in the state and (2) the adaptation in social and political control made possible by the comparatively slow growth. Mechanisms controlling ways of living together in small groups have had enough flexibility to allow the new changes accompanying increasing urbanization to be made with a minimum of social disorganization.

North Carolina is hardly yet an urbanized state, but shows an approximation of this goal. Judging by other criteria, there is less progress. The cities continue to form parts of the counties in matters of public health and public welfare administration and, in the main, in tax assessment. Their dependence upon the state legislature is as great as it was one hundred years ago.

HENRY NICHOLAS BROWN, III. A History of the Influence of Family Life on Recreation in the United States. (Under the direction of E. R. GROVES.)

This study traces the change in family life and recreational conditions, and the inter-relationship between the two, from the Colonial Period to the World War. The family is shown as it changes from the controlling factor in the early days to a position almost of sufferance by the second decade of the twentieth century. The causes for the change are not stressed. The method followed is that of stating the type of family life of each period and then showing, by examples, its effect on the recreation of the individual and the group.

STANLEY SCOTT STEVENS. A Critique of the Climatic Theories of Ellsworth Huntington with Special Reference to the South. (Under the direction of R. B. VANCE.)

This critique tests Huntington's contention that the South is handicapped to the extent that its climate deviates from optima found by him. The theory and proofs on which this contention rests are criticized by the following steps: (1) An estimate of the influence of non-climatic factors on mental and physical work and on the validity of Huntington's curves. (2) Comparison of Huntington's findings for health and efficiency with results secured by others. (3) Analysis of the adequacy of death rates as health criteria. (4) Criticism of the theory's concepts. (5) Comparison of meteorological data for the South and the Pacific Coast with the rankings of these sections by Huntington's maps of health, climatic energy, and civilization. From this critical analysis it appears that Huntington's climatic hypothesis, in as far as it applies to the South, remains unproved because of the defective procedure, concepts, and logic of the studies on which it depends.

HARRIETTE WOOD. The Kentucky Mountaineer: A Study of Four Counties of Southeastern Kentucky. (Under the direction of L. L. BERNARD.)

This thesis attempts to present the basic facts in the geology, physical features, historic background, and present culture of the people of four counties of southeastern Kentucky. A study of family names and birthplaces indicates that these counties were settled by migration from Virginia, North Carolina, and Tennessee. The region afforded a paradise to the first settler, but did not furnish sufficient level land and fertile soil to make possible an agricultural civilization. The exhaustion of the natural food supply, the geographic isolation, and the limitations of topography and soil have resulted in deterioration of the general level of life and in certain widespread pathological conditions. Exploitation of the region by mining corporations and lumber companies is rapidly taking place. In a large area, however, the culture probably adheres closely to that of the first pioneers and of their British ancestors. Lumbering,

road building, mining, and "moonshining" afford practically the only occupations.

The ultimate economic hope of the region lies in reforestation. In the meantime, the school seems to be the social agency best fitted to improve the mountain people.

INA V. YOUNG. Problems of the Small Town in North Carolina. (Under the direction of E. J. WOODHOUSE.)

A study of 64 small towns in North Carolina of between 1,000 and 2,000 population, based on the fact that 100,000 people of the state live in such towns and on the realization both of their importance and of the lack of information concerning them. It takes up the health problems of these towns, their educational efficiency, and their local government and administration, with comparisons in each case with the cities of the state, on the one hand, and with the rural sections on the other. The death rate is lower in the small towns than elsewhere, although they are utterly deficient in health organization, and the medical facilities are inadequate. Thus, whatever standards of health they maintain are attributable either to qualities of heredity or to the favorable environment. In the matter of education, the small town makes an efficiency score of 75 on a percentage basis; whereas the cities of the state are rated as 90, and the rural sections as 60. Because of lack of organized government and administration in the small town, the financial resources are small, the expenditures are correspondingly limited, the services rendered are few. However, the bonded indebtedness in most cases surpasses the maximum limitation allowed by law, thus indicating the need for new sources of revenue and also of a system of state administrative control.

DEPARTMENT OF ZOOLOGY

H. V. WILSON is continuing his study of the metamorphosis of the larva in monaxonid sponges. The work on the living larva was carried on, during the past academic year, at the Naples Zoölogical Station and later continued at the Beaufort Laboratory of the United States Bureau of Fisheries. A statement of some of the results reached was presented to the Elisha Mitchell Scientific Society on October 14, 1930.

(For abstract see page 95.)

PROFESSOR WILSON also reported on Two New Sponges from the Chesapeake Bay. *Journal of the Elisha Mitchell Scientific Society*, XLVI: 167. 1931.

There was published during the year the following paper embodying the results of work done during an earlier year under the direction of R. E. COKER:

H. R. SEIWELL. Influence of Temperature on the Rate of Beating of the Heart of a Cladoceran. *Journal of Experimental Zoölogy,* LVII: 331-346 (4 figs.).

A very definite general correlation between temperature and rate of heart-beat prevails, but the rule of correlation is not simple. The temperature coefficient for 10 degree intervals decreases with rise of temperature from 4 at 4-14° to 1.4 at 28-38° C. Diversity of rate among different individuals is wider at higher temperatures. With the majority of animals subjected to experiment, breaks in continuity of rise or fall of rate with rise or fall of temperature occur chiefly at intermediate temperatures rather than at high or low extremes. Independently of these breaks, there seems to be for most animals of the species (*Simocephalus exspinosus*) critical points where changes of the rate of acceleration with temperature are notable, but for different animals the "critical points" are not narrowly localized on the temperature scale. When the logarithm of the frequency is plotted against the temperature, employing for each point on the temperature scale the average rates for animals showing greatest regularity of response, two straight-line fittings are readily made and their intersection indicates a critical point somewhere in the neighborhood of 13° C.

J. MANSON VALENTINE has published during the year:

New Cavernicole *Carabidae* of the Subfamily *Trechinae* Jeannel. *Journal of the Elisha Mitchell Scientific Society,* LXVI: 247. 1931.

Ten new species and one new sub-species of blind cave-inhabiting ground beetles from the limestone caverns of the southern Appalachian region are described, with notes on their occurrence and the methods employed in their capture.

PROFESSOR VALENTINE is engaged in the following research projects:

A monograph of the *Trechinae* of America in which particular attention will be paid to the origin of species and the origin of adaptions as influenced by cave life.

A study in the modifications of the limb bones in jumping bipedal albino rats.

A study in flightlessness resulting from close confinement in the fruit-fly, *Drosophila melanogaster.*

The following master's theses were accepted by the Department during the year:

WILLIAM OLIN PUCKETT. The Embryonic Origin of the Heart, Blood Vessels, and Blood in Teleost Fishes. (Under the direction of H. V. WILSON.)

In the cod localized primordia corresponding to the intermediate cell masses of the trout and some other fishes were not found. The cells giving rise to the vascular system have their origin in the ventro-mesial angles of the somites and are not definitely marked off from those which produce skeletogenous and connective tissues.

LYLE LYNDON WILLIAMS. The Embryonic Origin of the Axial Skeleton in Teleost Fishes. (Under the direction of H. V. WILSON.)

A survey of the literature on the origin of these parts, more especially the vertebral column and skull. Also a description of original observations on the cod, in which form the skeletogenous mesenchyme of the trunk was found not to originate from distinctly outlined masses (sclerotomes) such as are produced in some fishes.

INSTITUTE FOR RESEARCH IN SOCIAL SCIENCE

Substantial grants from the Laura Spelman Rockefeller Memorial and the Rockefeller Foundation made to the University of North Carolina, for the study of problems in the social sciences arising out of state and regional conditions, led to the establishment in 1924 of an Institute for Research in Social Science, the main purpose of which is to assist faculty members in the prosecution of their research by means of research assistants, field expenses, and clerical help. The work of the Institute represents, therefore, a specific program of regional social research, study, and interpretation.* A summary of the work of the Institute for the current year follows:

The Institute, in coöperation with the University of North Carolina Press, published during the year.**

The State Highway System of North Carolina. By Cecil K. Brown.
Constitutional Development in the South Atlantic States. By Fletcher M. Green.

A Social History of the Sea Islands. By Guion Griffis Johnson.
Folk Culture on St. Helena Island. By Guy B. Johnson.
The Negro Sings a New Heaven. By Mary A. Grissom.
The Plight of Cigarette Tobacco. By T. J. Woofter, Jr.

The following manuscripts are in press or ready for publication:

*For a further statement regarding the establishment and the purposes of the Institute, see *Research in Progress,* 1928-1929, pp. 95-96.

**The book-list from 1924 to 1929 is found in *Research in Progress,* 1928-1929, pp. 96-97; 1929-1930, p. 80.

Trade Unionism and the South. By George S. Mitchell.
Homicide in the United States. By H. C. Brearley.

ERNEST R. GROVES has published during the year:

History of the Family for 1930. *American Journal of Sociology,* May, 1931.

Trends in Family Life in the United States. *The Stockholm Journal.*

PROFESSOR GROVES has edited for the Longmans Social Science Series:

The Sociology of City Life. By Niles Carpenter.

THOMAS J. WOOFTER, JR., has published during the year:

The Plight of Cigarette Tobacco. Chapel Hill: University of North Carolina Press. 1931. Cloth, ix, 99 pp.

DR. WOOFTER is continuing the research on ethnic groups in the United States, a unit in the research of the President's Committee on Social Trends. In addition to his own research, he is directing the researches in this field.

ROY M. BROWN has continued his statistical study of crime and criminal justice in North Carolina.

DR. BROWN has made for the White House Conference on Child Health and Protection a study of the organization and functions of local units of public welfare in the United States.

He has also submitted to the President's Committee on Social Trends a preliminary report on Recent Trends in Public Welfare, especially as indicated in the organization and functions of county units.

DR. BROWN has collaborated with HOWARD W. ODUM and others in the preparation of a report on prison conditions in North Carolina for the Governor's Prison Commission.

CLARENCE HEER has published during the year:

Taxation of Public Service Corporations. *Report of the Tax Commission of North Carolina, 1930,* p. 171 ff.

An investigation into the adequacy of the burden of state and local taxation on railroads, power companies, and other public utilities, including recommendations for changes in existing tax laws.

The North Carolina State and Local Tax System as of January 1, 1931. *Federal and State Tax Systems,* second edition, January 1, 1931. The Tax Research Foundation.

A tabular analysis of North Carolina's taxes.

DR. HEER has also completed during the year:

(With HOWARD W. ODUM and others.) Prison Finances. Special report on prison conditions in North Carolina for the Governor's Prison Commission. November, 1930.

An analysis of the financial results of operation of the North Carolina State Prison for the period 1910 to 1930, inclusive.

The North Carolina Tax Situation (unpublished manuscript).

A review of the various factors contributing to the crisis which faced the North Carolina State Legislature in 1931. A survey of trends in taxable capacity, public expenditures, public indebtedness, and tax collections from various sources during the last ten years is followed by a critical analysis of various proposals for financing the mandatory six months' school term on a state-wide basis.

DR. HEER has in progress the following research:

Trends in Public Welfare Costs. (In coöperation with the President's Committee on Social Trends).

A statistical analysis of expenditures for public welfare in the United States during the last quarter of a century.

A review of recent economic and social changes with relation to their effect upon the problems of governmental finance.

HARRIET L. HERRING has published during the year:

The College Woman and Her State. *Meredith College Quarterly Bulletin,* Series 23, No. 4. Commencement Number 1929-30.

The Southern Industrial Problem: As the Social Worker Sees It. *Proceedings,* National Conference of Social Work, 1930, p. 309 ff.

The Social Problem of Labor Organization Casualties. *Social Forces,* IX: 267 ff.

Early Industrial Development of the South. *Annals of the American Academy of Political and Social Science,* 153: 1 ff. January, 1931.

MISS HERRING has continued her history of the textile industry in the South. It is expected that the manuscript will be ready for publication at an early date.

This study will cover the development of textile manufacturing from the domestic stage in the colonial and early national periods; the rise of the mills, expansion and diversification, concentration and localization, and the transplanting of the industry; some attention to technical development and to financial, manufacturing, and marketing organization; and with at least passing reference to group interests of owners and workers, to the social implications of the mills, and to the textile industry in Southern public opinion and policy.

KATHARINE JOCHER has under way the following research:

Trends in Public Welfare: A Study of the Literature from 1900 to 1930. (In coöperation with the President's Committee on Social Trends.)

The study is limited to the United States with major emphasis on the thirty-year period, 1900 to 1930. The data will be gathered from minutes and proceedings, journals, periodicals, etc., and other materials largely of a fugitive nature.

DR. JOCHER (with HOWARD W. ODUM) is also continuing the studies of regional and folk sociology.

GUY B. JOHNSON has published during the year:

Folk Culture on St. Helena Island, South Carolina. Chapel Hill: University of North Carolina Press. 1930. Cloth, ix, 183 pp.

A Summary of Negro Scores on the Seashore Music Talent Tests. *Journal of Comparative Psychology,* XI: 383. 1931.

The Negro Spiritual: A Problem in Anthropology. *American Anthropologist,* XXXIII: 157. 1931.

DR. JOHNSON has under way the following research:

Trends in Race Relations in the South.

Liberal and Radical Movements and Attitudes Among Negroes.

Preparation of a source book of selected readings on the Negro.

DR. JOHNSON has directed the following research:

In coöperation with JOHN M. MACLACHLAN, a study of racial attitudes in the Negro press.

GUION GRIFFIS JOHNSON has published during the year:

A Social History of the Sea Islands, with Special Reference to St. Helena Island, South Carolina. Chapel Hill: University of North Carolina Press. 1930. Cloth, ix, 245 pp.

DR. JOHNSON has completed a study of courtship and marriage customs in ante-bellum North Carolina, which is to be published in the *North Carolina Historical Review.*

DR. JOHNSON has under way:

A social history of North Carolina, 1800-1860. It is expected that the manuscript will be completed shortly.

A social history of the American family. The collection of data for this project is under way.

RUPERT B. VANCE has published during the year:

A Karl Marx for Hill Billies: Portrait of a Southern Leader. *Social Forces,* XI: 180. 1930.

The Southern Labor Supply. *University of North Carolina Extension Bulletin,* X: 2: 16-21. 1930.

Changing Regions of the American South. *University of North Carolina Extension Bulletin,* X: 9: 14. 1931.

DR. VANCE has under way the following research:

Human Geography of the South: A Study in Regionalism. The manuscript is now being prepared for publication.

Detailed studies of population, topography, plants and animals, forestry, soil, and social geography of Southern agriculture, livestock and dairying, transportation and communication, demography, diet and nutrition, climate in its relation to energy, health, work, and Southern culture are some of the factors to be included. Two of the three years' work required for the completion of the first volume have been done.

The Profile of Southern Culture. A chapter in *Culture below the Potomac: A Symposium.*

A study of sociology and cultural geography of the frontier and its heritages.

A study of Southern political leaders—their interest groups, tactics, and personalities.

Assembling of readings and text material for a course in regional demography and ecology.

E. C. BRANSON and his field assistant, COLUMBUS ANDREWS, have continued their detailed examination of county government and county affairs.

Six South Carolina counties have been investigated during the year, and Mr. Andrews is now at work on a comprehensive study of the administration of county government in this state.

JULIA C. SPRUILL, under the direction of R. D. W. CONNOR, has continued her study of women in the Southern colonies.

A study of the different phases of the life of women with special reference to their function in colonization, legal and political status, crimes and punishments, employment in gainful occupations, education, courtship and marriage, status in the home, position in the churches, and to Negro women and the general conception of the "female character."

INA V. YOUNG, under the direction of EDWARD J. WOODHOUSE, has completed a study of the problems of the small town in North Carolina.

(See also the several departments of Economics, History and Government Rural Social-Economics, Sociology, etc.)

RESEARCH ORGANIZATIONS

THE ELISHA MITCHELL SCIENTIFIC SOCIETY

322nd Meeting, October 14, 1930

H. V. Wilson. The Larval Metamorphosis in Monaxonid Sponges.

In a study of the metamorphosis of the monaxonid sponge larva carried on at the Naples Zoölogical Station during 1929-1930, attention was concentrated on *Mycale* (*Esperia, Esperella*) *lorenzi.* The so-called inversion of the layers was found to be true. Certain mesenchyme cells break through the surface epithelium of the larva and become the permanent epidermis, the epithelium cells passing into the interior and becoming the collar cells. The cell behavior leading to this result is still under investigation. Delage's account of the engulfing of the epithelium cells by amoebocytes with their subsequent liberation rests, it is thought, on an erroneous interpretation of the phagocytosis of degenerating cells.

Collier Cobb. Light on the Loess Problem from the Mississippi Valley. (By title.)

323rd Meeting, November 11, 1930

T. F. Hickerson. Stress Analysis by Mechanical Methods. (Demonstrated.)

An apparatus measuring the deformations of elastic models of structures or machines was exhibited. This device, invented by Professor George E. Beggs of Princeton University, consists of gages, gage plugs, and micrometer microscopes which furnish a precise means for measuring small displacements and deflections of the model. This information enables one to determine the relation between loads and reactions on the actual structure, however complex or unsymmetrical it may be.

A small celluloid model of a 160-foot concrete arch bridge constructed by the Georgia Highway Commission in 1927 was shown; and a determination of the thrust, shear, and bending moment in the arch caused by a load was demonstrated with the aid of the Beggs deformeter. A comparison with results obtained by means of a mathematical analysis of this arch showed a remarkably close agreement.

It was stated that although the model is usually cut from a sheet of celluloid, the results obtained apply to material of any kind in the actual structure.

W. C. Coker. Some Interesting Early American Naturalists.

324TH MEETING, DECEMBER 9, 1930

A. S. WHEELER. The Bromination of 1, 5-Dihydroxynaphthalene.
(For abstract see page 8.)

K. H. FUSSLER. The Electrical Resistance of the Human Body.
(For abstract see pages 64-65.)

325TH MEETING, JANUARY 13, 1931

J. F. DASHIELL. A Forward Going Tendency in Maze Running.
(For abstract see page 66.)

OTTO STUHLMAN, JR. A Thermionic Megger with Linear Scale.
(For abstract see page 62.)

326TH MEETING, FEBRUARY 10, 1931

N. P. BAILEY. Response of Thermocouples to Rapidly Oscillating Temperatures.
(For abstract see page 35.)

F. K. CAMERON. Absorption of Sulphur Dioxide by Calcium Phosphates.
(For abstract see page 11.)

327TH MEETING, MARCH 10, 1931

G. R. MACCARTHY. Beach Sands.

Sieve analyses of beach sands collected from the Atlantic Coast indicate that:

1. There is a strong tendency for the sands to move southward along relatively straight segments of the coast.

2. The gradual diminution in average grain size is, when measured as "average fineness," a linear function of the distance traveled.

3. There is strong evidence in support of the idea that near openings in the coast line, i.e., estuaries, inlets, etc., the effective direction of shore drift is toward the inlet, even if this reverses the regional drift.

4. In many cases evidence was obtained that a portion of the sand was of local origin, while another portion of it had been drifted in from farther north.

J. N. COUCH. Some Biological Associations Between Insects and Micro-organisms.

328th Meeting, April 14, 1931

H. A. Ljung. A System of Qualitative Analysis for the Anions.

(For abstract see page 13.)

W. C. George. Some Significant Examples of Rhythm in Organisms.

(For abstract see page 6.)

329th Meeting, May 12, 1931

Archibald Henderson. The Expanding Universe.

J. M. Valentine. Blind Cave Beetles.

The American *Trechinae* of the family *Carabidae* (ground beetles) have been selected to furnish material for a monograph which is intended to be a study in adaptation to circumscribed environmental conditions. The *Trechinae* nicely fulfil this requirement, since they are normally restricted to the inner recesses of limestone caverns.

A recent trip to the southern Appalachian limestone system in which seventeen caves were explored has revealed the fact that the group extends its range over an area vastly larger than the previous records of collectors would indicate. Eleven new forms representing the general *Pseudanophthalmus* and *Neaphaenops* strongly augment the evidence that the extent of interspecific difference in anophthalmids can be correlated with the remoteness of isolation achieved by subterranean migration and geologic change.

Evidence was put forward in defense of the theory of orthogenesis, or directive evolution. It was emphasized that internal factors operating to vary organisms should be viewed as correlated with external or environmental factors, not as random forces productive of mutations which owe their survival solely to the selective action of the environment; evidence was cited to the effect that natural selection is of little more than secondary importance in orthogenesis, or even in many cases of drastic mutation.

In conclusion, it was pointed out that the adaptive characters in anophthalmid beetles are probably the results of long and gradual orthogenic change, but that the interspecific characters of relatively recent origin represent the beginnings of secondary lines of evolution in which the characters apparently partake of the nature of fortuitous mutations.

THE PHILOLOGICAL CLUB

OCTOBER 7, 1930

RAYMOND ADAMS. The Transcendentalist's Part in the Introduction of German Literature to America.

A study of the activities of the transcendental group in popularizing German literature in translation and in the original German. Special attention is paid to the work of Miss Fuller, Frederic H. Hedge, and George Ripley.

GEORGE HOWE. The Development of the Character of Aeneas.

(For abstract see page 19.)

NOVEMBER 4, 1930

N. B. ADAMS. Versions of the Legend of the Lovers of Teruel.

This paper offered first a brief survey of the treatments of the legend in Spanish literature before Hartzenbusch's play. It was then shown that Hartzenbusch made five redactions of *Los Amantes,* and that his tendency was to make his work less Romantic in each successive reworking. He was urged thereto by respect for criticism, by sobering judgment, and by a realization of the waning of Romanticism in popular favor.

DECEMBER 1, 1930

A. C. HOWELL. John Dunton, and an Imitation of the *Religio Medici.*

(For abstract see *Research in Progress* 1929-1930, p. 31.)

JANUARY 13, 1931

S. E. LEAVITT. Latin-American Literature in the United States.

This paper traces the interest in Latin-American literature felt in this country from the early nineteenth century down to the present time. After the movement was initiated in 1827 with an anonymous translation of Heredia's *Ode to Niagara,* a number of nineteenth-century writers made other contributions. The most important of these were William Cullen Bryant's translation of Heredia's *Hurricane,* W. H. Hurlburt's studies published in the *North American Review* and elsewhere, Mrs. Horace Mann's translation of Sarmiento's *Facundo,* and Rollo Ogden's translation of Isaac's *María.*

In the twentieth century the movement, though rather slow at first in making itself felt, gained rapid headway after the year 1915 until a veritable flood of translations, critical articles, and school texts gave the literature of our Southern neighbors a large measure of attention. Since 1908 courses in Latin-American literature have been steadily introduced into our colleges and universities.

(Published in the *Revue de Littérature Comparée,* XI: 126-48. 1931.)

March 2, 1931

(Joint meeting with the Erasmus Club of Duke University at Duke University).

A. P. Hudson. Mississippi Folk Ballad Material.

Describes a collection of folk-songs gathered from oral tradition among white people in Mississippi. Taking a few songs representative of various types in his collection and commenting upon them, the author illustrated the age and vitality of the tradition that had preserved them, their intimate relations to the lives of the singers, and characteristic changes they had undergone in process of transmission.

April 7, 1931

U. T. Holmes, Jr. Materials for the Life and Works of Du Bartas.

W. R. Abbot. The Date of the First Complete English Translation of Du Bartas.

May 5, 1931

Gustav Plessow (of the University of Tübingen). A New Theory of Middle English Dialects.

Taking into consideration the distribution of the population in England during the fourteenth and fifteenth centuries, showing the influence of traffic along the then known routes of travel, on the distribution of scriptoria and on the social conditions of the scribes, and giving examples of scribes wandering from southern to northern scriptoria and from scriptoria *in diaspora* to those in the centers of traffic (such scribes taking some of their native dialect forms with them), the author offered several proofs for his theory that the distribution of Middle English dialects conforms to the trade routes in a beetle-shaped pattern rather than to areas separated by language boundaries of the shape of a recumbent capital H, as was formerly believed. The exact proof, however, can only be secured through a paleographical analysis of *all* manuscripts written in Middle English. This immense task can only be accomplished, as was proposed, by the teamwork of trained paleographers.

THE SOCIETY OF SIGMA XI

The University of North Carolina Chapter of the Society of the Sigma Xi held six regular monthly meetings during the year. At four of these meetings members of various scientific departments in the University gave brief accounts of the research projects that they had under way. The annual lectures were given on April 27 and 28 by Dr. Alfred N. Richards, head of the Department of Pharmacology, in the University of Pennsylvania. His general subject was "The Physiology of the Kidney," the specific titles of his lectures being "The Function of the Glomerulus" and "The Functions of the Renal Tubule."

At the commencement meeting on May 26, retiring President Otto Stuhlman delivered an address on the subject, What lies beyond the Axioms of the Rational Sciences? During the year eight associates were promoted to active membership; twenty associates and one alumnus were initiated.

RESEARCH PUBLICATIONS

JOURNAL OF THE ELISHA MITCHELL SCIENTIFIC SOCIETY

Volume XLVI, I—November, 1930

Proceedings of the North Carolina Academy of Science.

The Corpuscular Theory of Radiation and the Wave Theory of Matter. *J. B. Derieux.*

Duplicity and Other Abnormalities in Diamond-back Terrapins. *Samuel F. Hildebrand.*

The Determination of Small Amounts of Hydrogen Sulphide. *W. V. Harshman, D. A. McPherson,* and *F. H. Edmister.*

Winter Root Development of *Ligustrum vulgare. Frankie Jo Mann.*

The Jonesboro Fault Scarp West of Cary, N. C. *E. F. Goldston* and *Jasper L. Stuckey.*

A Partial Check List of the Ferns Found in the Mountain Park and Roaring Gap Region. *Earl H. Hall.*

Some Observations on Tilia (Basswood) Seeds. *Gertrude Grimsley.*

The Birds of Raleigh, N. C. *C. S. Brimley.*

The Bald Cypress. *W. C. Coker.*

Diatoms of Beaufort. Edited by *Bert Cunningham.*

The Effect of Nitrate Fertilizer on Stomatal Behavior. *Annie L. Pleasants.*

Notes on Fungi, with a Description of a New Species of Ditiola. *W. C. Coker.*

Volume XLVI, 2—June, 1931

William Cain.

Proceedings of the Elisha Mitchell Scientific Society, October 8, 1929, to May 13, 1930.

Flora of the Tryon Region. Part VI. *Donald Culross Peattie.*

The Ecology of Certain Crustaceans on the Beaches at Misaki, Japan. *A. S. Pearse.*

Two New Sponges from the Chesapeake Bay. *H. V. Wilson.*

A Check List of the Common Mosses of Durham, N. C., and Vicinity. *H. L. Blomquist.*

Observations and Experiments Relating to the Bacterial Pustule Disease of Soybean. *S. G. Lehman.*

Powdery Mildew of Soybean. *S. G. Lehman.*

Polycodium. W. W. Ashe.

A New Species of *Trichodina* from a Salamander. *Yasushi Ibara.*

Symplocos tinctoria Ashei. *T. G. Harbison.*

Occurrence and Habitat of *Cordyceps Agariciformia* (Bolt.) Seaver in Florida. *George F. Weber.*

Observations on Some Species of Water Molds Connecting *Achlya* and *Dictyuchus*. *John N. Couch.*

Micromyces Zygogonii Dang. Parasitic on Spirogyra. *John N. Couch.*

Notes on Fresh-Water Sponges and Their Epithelioid Membranes. *J. T. Penney.*

New Cavernicole *Carabidae* of the Subfamily *Trechinae* Jeannel. *J. Manson Valentine.*

Traps for Cave-Inhabiting Insects. *H. S. Barber.*

Genetics of Mosses. *H. L. Blomquist.*

STUDIES IN PHILOLOGY

VOLUME XXVII, 3—JULY, 1930

American Studies: Fifth Series

Lowell—Humanitarian, Nationalist, or Humanist? *Harry Hayden Clark.*
Lowell on Thoreau. *Austin Warren.*
Sidney Lanier and Edward Spencer. *E. P. Kuhl.*
Irving's German Sources in *The Sketch Book*. *Henry A. Pochmann.*
James Fenimore Cooper as Self-Critic. *Tremaine McDowell.*
Emerson and the Swedenborgians. *Clarence Hotson.*
Poe's Knowledge of the Bible. *Killis Campbell.*

VOLUME XXVII, 4—OCTOBER, 1930

Linguistics as a Science. *Leonard Bloomfield.*
Henry Sweet—Shaw's *Pygmalion*. *Bertrand M. Wainger.*
The Corpus Christi Plays as Drama. *Robert Withrington.*
The Beginnings of Nature Poetry in the Eighteenth Century. *George C. Williams.*
The English Reaction Against Voltaire's Criticism of Shakespeare. *R. W. Babcock.*
Racine and Talma. *G. H. Gifford.*
Coleridge and His Son. *Earl Leslie Griggs.*
"Julian and Maddalo." *Raymond D. Havens.*
The Stage in Reade's Novels. *Emerson Grant Sutcliffe.*
Author's Correction—Corpus Christi Plays as Drama. *George R. Coffman.*

VOLUME XXVIII, 1—JANUARY, 1931

Some Characteristics of Roman Lettering and Writing. *G. A. Harrer.*
The Theme of Spenser's "Fowre Hymnes." *Josephine Waters Bennett.*
Handbook Learning of the Renaissance Middle Class. *Louis B. Wright.*
Sir Thomas Browne and the Elizabethans. *Alwin Thaler.*
Hartley Coleridge and Wordsworth's Lucy. *John D. Rea.*

VOLUME XXVIII, 2—APRIL, 1931

Political Ideas in Sidney's *Arcadia*. *William Dinsmore Briggs.*
The *Arcadia* and "The Fish Torpedo Faire." *Emma Marshall Denkinger.*
A Possible Christian Source for Spenser's Temperance. *Viola Blackburn Hulbert.*
Spenser and *The Pilgrimage of the Life of Man*. *Frederick Morgan Padelford.*
Spenser and Burghley. *Frederick Hard.*
Spenser's Belge Episode and the Pageants for Leicester in the Low Countries, 1585-86. *Ivan I. Schulze.*
The Influence of Ovid's *Metamorphoses* on Spenser's "Mutabilitie" Cantos. *William P. Cumming.*
A Note on *Midsummer Night's Dream*. *M. L. Howe.*
Notes on Milton's Classical Mythology. *Douglas Bush.*
Recent Literature of the English Renaissance. *Hardin Craig.*
Italian Renaissance Studies in 1930. *Walter L. Bullock.*

THE NORTH CAROLINA LAW REVIEW

VOLUME IX, 1—DECEMBER, 1930

1. Four Suggested Improvements in the North Carolina Legislative Process. *M. T. Van Hecke.*
2. Proposals for Legislation in North Carolina.
3. The Codification of Criminal Procedure in North Carolina.

VOLUME IX, 2—FEBRUARY, 1931

1. Trust Administration: Apportionment of Proceeds of Sale of Unproductive Land and of Expenses. *Henry Brandis, Jr.*
2. The Parole Evidence Rule in North Carolina. *James H. Chadbourn* and *Charles T. McCormick.*
3. Purchase Money Resulting Trusts in North Carolina. *J. Glenn Edwards* and *M. T. Van Hecke.*
4. Tax Escape by Manipulations of Holding Company. *M. S. Breckenridge.*

VOLUME IX, 3—APRIL, 1931

1. Interest as Damages. *Charles T. McCormick.*
2. Divorce in South Carolina. *J. Nelson Frierson.*
3. Territorial Jurisdiction of Local Law Enforcement Officers. *Charles M. Kneier.*

VOLUME IX, 4—JUNE, 1931

1. A Survey of Statutory Changes in North Carolina in 1931.
2. Power of the States to Tax Intangibles. *Henry Rottschaefer.*
3. *The Law Review.*
4. Bar Association Meeting.

SOCIAL FORCES

VOLUME IX, 1—OCTOBER, 1930

The Significance of the Concept of Consciousness of Kind. *Theodore Abel.*
The Biological Variate and Culture. *James W. Woodard.*
The Status of Sociology in Italy. *Robert Michels.* Tr. by *Mildred Hartsough.*
Culture and Environment. *L. L. Bernard.*
Sixteen other articles in the departments of Teaching and Research in the Social Sciences; Public Welfare and Social Work; Community and Neighborhood; Marriage and the Family; Race, Cultural Groups, Social Differentiation; Government, Politics, Citizenship; Social Industrial Relationships.

VOLUME IX, 2—DECEMBER, 1930

Forms of Population Movement. *Howard W. Becker.*
Cooley, a Great Teacher. *Read Bain.*
The Concept "Culture Conflict." *Maurice T. Price.*
Contemporary Sociology in Czechoslovakia. *Arnošt Bláha.* Tr. by *Mildred Hartsough.*
A Karl Marx for Hill Billies. *Rupert B. Vance.*
Fourteen other articles in the departments of Teaching and Research in the Social Sciences; Public Welfare and Social Work; Community and Neighborhood; Marriage and the Family; Race, Cultural Groups, Social Differentiation; Government, Politics, Citizenship; Social Industrial Relationships.

VOLUME IX, 3—MARCH, 1931

The Vocabulary of Sociology. *Earle Edward Eubank.*
Teaching Sociology:

1. The Teaching and Content of Introductory Courses. *Erville B. Woods.*
2. A Discussion of the Introductory Course. *Ray Erwin Baber.*
3. Further Suggestions Concerning the Content of an Elementary Course. *Frank H. Hankins.*
4. A Useful Approach. *Carl A. Dawson.*
5. A Proposed Reorganization of the Introductory Course. *Malcolm M. Willey.*

A New Approach to the Problem of Individualism. *V. F. Calverton.*
Forms of Population Movement: II. *Howard W. Becker.*
Ten other articles in the departments of Teaching and Research in the Social Sciences; Marriage and the Family; Race, Cultural Groups, Social Differentiation; Government, Politics, Citizenship; Social Industrial Relationships.

VOLUME IX, 4—JUNE, 1931

"Gestalt" and Case Study:

1. The "Situation" as the Unit of Family Case Study. *Ada E. Sheffield.*
2. Units and Their Definitions in Social Science. *Stuart A. Rice.*

3. Is Statistical Methodology Applicable to the Study of the "Situation"? *Robert M. MacIver.*
4. Some Problems of the Situational Approach. *Stuart A. Queen.*
5. The Situational Approach—A Reaction to Individualism. *Frank J. Bruno.*

Culture Conflict and Delinquency:

1. Culture Conflict and Misconduct. *Louis Wirth.*
2. Culture Conflict versus the Individual as Factors in Delinquency. *Floyd H. Allport.*
3. Culture Conflict and Physical Inadequacy as Bases for Misconduct. *T. Wingate Todd.*

Thirteen other articles in the departments of Public Welfare and Social Work; Community and Neighborhood; Marriage and the Family; Social Industrial Relationships.

PART II

FACULTY PUBLICATIONS

The second section of this bulletin contains a list of faculty publications of a less scholarly nature than those mentioned in the first section but nevertheless worthy of record. No attempt has been made to admit pieces of work not yet published. The list is arranged alphabetically by authors. Abstracts have been wholly omitted, to conserve space.

Raymond Adams. "Thoreau, Pioneer in Adult Education," *The Institute Magazine,* III: 6-7, 14. 1930. "Thoreau and the Photographers," *Photo-Era Magazine,* LXVI: 239-243. May, 1931.

English Bagby. *Emotional Reactions and Human Efficiency.* A Pamphlet. (Orange Printshop, Chapel Hill.) 1931.

L. L. Bernard. The following articles in volumes II, III, and IV of the *Encyclopedia of the Social Sciences:* "Augustin Alvarez," II: 16. "Social Attitudes," II: 305-307. "Joao de Barros," II: 467. "Andres Bello," II: 507. "Carlos Octavio Bunge," III: 67. "Crowd," IV: 612-613.

"Interêt des Relations internationales pour les Sociologues de L' Amerique du Nord," in *The Annual Publications of the Institut Internationale de Sociologie.* 1931.

R. P. Bond (with Marjorie N. Bond). "Adventures in Reading, Third Series: Current Books, 1929-1930," *University of North Carolina Extension Bulletin,* X: 1. Book reviews in *The Bookman,* November, 1930; April, June, 1931.

G. R. Coffman. *Five Significant English Plays.* Thomas Nelson & Sons. 1930.

W. C. Coker. "What Nature Gave to Carolina," *Nature Magazine,* XVII: 294. 1931. (Carolina number.)

Donald Coney. "Scientific Management in University Libraries," *Management Problems,* ed. by G. T. Schwenning, pp. 168-198. University of North Carolina Press. 1930. "Description of the Building," *The Dedication of the Library Building.* The University of North Carolina. 1930.

J. F. Dashiell. *An Experimental Manual in Psychology.* Houghton Mifflin Company. 1931.

F. H. EDMISTER. "High School and College Chemistry," *Journal of Chemical Education,* VII: 12. December, 1930.

E. E. ERICSON. Review of "The Autobiography of Mahatma Gandhi," *Alumni Book Club Bulletin.* November, 1930. Review of "The Education of a Princess," by Grand Duchess Marie, *Alumni Book Club Bulletin.* March, 1931. Verse: "The Serf," "The Sheepherder," *Northwest Verse,* ed. by H. G. Merriam. The Caxton Printers, Caldwell, Idaho. 1931.

WIRTH F. FERGER. Book review of F. H. Harper's "Elements of Practical Statistics," *Journal of the American Statistical Association,* June, 1931.

KARL H. FUSSLER (and P. E. SHEARIN). *A New Venture in Teaching University Physics.* A report. "A Syllabus in Physics for Pharmacy Students," to be published in *The National Pharmaceutical Syllabus.* Fourth edition.

A. C. HOWELL. "Some Problems in the Teaching of Composition" (read before the Southeastern Section of the North Carolina Teachers' Association, Fayetteville. November, 1930). (With THOS. B. STROUP and J. O. BAILEY.) *Supplementary Exercises for Use in English Courses for Engineers.* John Wiley & Sons. 1931.

A. P. HUDSON. "Git Up an' Bar the Door." Produced by The Carolina Playmakers November 6, 7, and 8, 1930, and published in *The Carolina Playbook,* III: 4. December, 1930.

HUGO GIDUZ (with URBAN T. HOLMES). *Sept Contes de La Vieille France.* D. C. Heath & Co. 1930.

ERNEST R. GROVES. "The Institute of Marriage," *Physical Culture Magazine.* "Marriage," *Collier's Encyclopedia.* "Mental Hygiene," *P. T. A. Bulletin,* Charlotte, N. C. *Introduction to Sociology.* Revised edition. (In press.) Longmans, Green. (With GLADYS HOAGLAND GROVES.) "Lost Birthrights or Training the Child to Work," *McCall's Magazine.* November, 1930. "The Parent Shapes the Child," *Parents Magazine.* (With PROFESSOR EDNA L. SKINNER, Massachusetts State College, and MISS SWENSON, Practical Arts High School, Springfield, Mass.) *Family Relations for High School Students. An Hour on Sociology.* Lippincott. *Sex in Marriage.* Macaulay.

FREDERICK H. KOCH, editor, *Carolina Folk Comedies* (fourth series of *Carolina Folk Plays*). Samuel French. 1930. *The Carolina*

Play-Book. The Carolina Playmakers, Chapel Hill. Editorial articles: "A Yankee Playmaker," September, 1930; "A Playmaker from Mississippi," December, 1930; "Loretto Bailey's New Play," March, 1931; "Ever' Snitch," June, 1931; "Playboy of Oklahoma," June, 1931. "The Author and the Play," Introduction to *Job's Kinfolks,* a play in three acts. Walter H. Baker. Boston, Mass. 1930. "A Chinese Playmaker," *The Magazine World.* January, 1931. "Ten-Twenty-Thirty," *Virginia Drama Magazine,* April, 1931. "Toward a New Folk Theatre," *The Quarterly Journal,* University of North Dakota. May, 1930.

J. W. LASLEY, JR. (with E. T. BROWNE). *Introductory Mathematics,* a textbook for first-year college students. "Course in Mathematics for Pharmacy Students," an outline for the *National Pharmaceutical Syllabus.*

R. W. LINKER (with N. B. ADAMS). Ramon del Valle-Inclan, "Sonata de Primavera." (With HUGO GIDUZ.) "Jose Marie de Heredia," *Les Trophees.* (With F. B. SIMKINS.) Gilberto Freyre, "Apologia pro Generatione Sua," Translation, *Poet Lore.* 1931.

J. C. LYONS (with COLBERT SEARLES). *Selected Plays of Corneille, Molière, and Racine.* A classroom edition, with introduction, notes, and vocabulary. Henry Holt & Company. 1931.

CECIL J. MCHALE. "An Experiment in University Circulation Files." *Library Journal,* XLV: 527-8.

HAROLD D. MEYER. Edited the following volumes for the *Extra Curricular Library:* "Student Participation in School Government," by JERRY J. VINEYARD and CHARLES F. POOLE; "The Class Organization and Activities," by MARGARET MACDONALD; "Extra Curricular Activities of High School Girls," by OLIVIA POUND; "Safety Education," by IDABELLE STEVENSON; and "Intramural Athletics," and "Play Days," by EDGAR M. DRAPER and GEORGE M. SMITH. 1931. Published *The School Club Program,* A. S. Barnes & Co. 1931. Recreation Notes for *State Parent-Teacher Bulletin* (five issues 1930-31). "Some Positive Thinking about Extra Curricular Activities," *School Activities.* May, 1931.

H. W. ODUM. *Cold Blue Moon: Black Ulysses Afar Off.* The Bobbs-Merrill Company. 1931.

W. W. PIERSON, JR. "Graduate Work in the Summer Session" (read before the Association of American Universities at Berkeley. November, 1930). "A New Type of Master's Degree" (read before the Conference of Deans of Southern Graduate Schools at Atlanta. December, 1930).

CARLTON E. PRESTON. "Following the Straight Path in Science and Wayside Browsing," *North Carolina Teacher,* pp. 249-250, 294. March, 1931.

G. T. SCHWENNING. "Industry's Responsibility for Unemployment" (read before the North Carolina Social Service Conference at Goldsboro, N. C., April 7, 1931). "Is Paternalism Necessarily Vicious?" *Textile World,* August 23, 1930. "A Pragmatic View of Employee Welfare Work," *North Carolina Club Yearbook,* X: 2: 66.

SAMUEL SELDEN. "Stage Lighting: A Tom Thumb Lecture on Equipment," *Carolina Playbook,* III: 3. September, 1930. (With HUNTON D. SELLMAN.) *Stage Scenery and Lighting,* F. S. Crofts & Co. 1930.

H. H. STAAB. *A Manual of Commercial French Correspondence.* (With HUGO GIDUZ.) *Commercial French Correspondence.* (Ready for the press.)

THOMAS B. STROUP (with J. O. BAILEY and A. C. HOWELL). *Supplementary Exercises for Use in English Courses for Engineers.* John Wiley & Sons. 1931.

H. R. TOTTEN. *Laboratory Guide in Pharmaceutical Botany and Pharmacognosy,* 2nd edition. University Book Exchange. 1931. (With W. C. COKER.) *Laboratory Guide in General Botany,* 3rd edition. Published by the authors. March, 1931.

M. T. VAN HECKE. Book Reviews: Frankfurter and Greene, *The Labor Injunction* (1930), IX *North Carolina Law Review* 113. 1930. Walsh, *A Treatise on Equity* (1930), *ibid.,* 125. 1930. Hanna, *The Law of Coöperative Marketing Associations* (1931), *ibid.* 1931. Stephenson, *English Executor and Trustee Business* (1930), *ibid.,* June, 1931. Robinson, *Saving Taxes in Drafting Wills and Trusts* (1930), *ibid.,* June, 1931. "Insurance Trusts—The Insurer as Trustee," 52 *Trust Companies Magazine* 495. April, 1931.

LOUIS R. WILSON. "The Board of Education for Librarianship," American Library Association *Bulletin,* XXV: 1, 5-11. 1931.

INDEX

Page

Abbot, W. R. 99
Abernethy, Roy F. 18
Adams, Louise 59
Adams, N. B. 72, 75, 98, 108
Adams, Raymond 39, 98, 106
Aderholdt, Claude H. 29
Ahner, Florence 43
Albritton, G. G. 14
Alexander, Naomi 58
Andrews, Columbus 78, 94
Ange, Fannie M. 59
Atkinson, Minnie 29
Austin, Lucy E. 22
Bagby, English 66, 106
Bailey, J. O. 109
Bailey, N. P. 35
Baity, H. G. 33, 34
Baker, H. R. 16
Barber, Ira W., Jr. 53
Bayroff, A. G. 66, 67
Belcher, R. H. 17
Bell, J. M. 7
Bell, Martha 21
Bernard, L. L. 82, 86, 106
Boggs, Ralph S. 73, 77
Bond, Marjorie N. 106
Bond, R. P. 39, 106
Boney, Inez C. 80
Booker, John M. 36, 47
Borgstrom, P. 16
Bost, R. W. 16
Branson, E. C. 78, 80, 94
Brashear, Minnie M. 39
Brearley, H. C. 90
Breckenridge, M. S. 58
Briggs, D. H. 28
Brooks, Lee M. 82
Brown, C. K. 59, 90
Brown, D. F. 16
Brown, Henry N., III 86
Brown, Kent J. 51
Brown, Roy M. 81, 90
Browne, E. T. 108
Bundrick, Olin W. 30
Byrd, Ralph M. 12
Caldwell, Elizabeth 55
Cameron, F. K. 10, 11, 15
Carmichael, Peter A. 60
Carpenter, Benjamin F. 74
Carroll, D. D. 23
Carroll, H. A. 30
Chadbourn, James H. 58
Chamberlain, Olivia H. 61
Chapin, Ethel M. 7

PAGE
Cheek, John M. 61
Cheek, Philip M. 20
Cobb, Collier 48, 50
Coffman, George R. 36, 106
Coker, R. E. 88
Coker, W. C. 6, 106, 109
Collins, Ralph S. 51
Coney, Donald 106
Conn, M. W. 16, 17
Connor, R. D. W. 94
Constable, E. W. 14
Couch, Elizabeth C. 56
Couch, John N. 7
Cox, Floyd M. 30
Crane, H. W. 69
Craven, C. J. 63
Creech, Walter D., Jr. 74
Crittenden, C. C. 53
Crockford, H. D. 10, 15
Crossen, Helen J. 43
Cubbage, S. C. 10
Darden, Bernice S. 31
Dashiell, J. F. 66, 67, 68, 70, 106
Derrick, S. M. 78, 80
Dey, William M. 71
Deyton, Jason B. 53
Dickson, M. R. 55
Dimmick, Graham B. 68
Dobbins, J. T. 12
Dockery, N. W. 11
Dorn, Lillian 22
Douglas, Claire J. 75
Dozier, J. P. 10
Edmister, F. H. 14, 15, 107
Edwards, J. G. 58
Elliott, F. S. 44
Elliott, Van Courtlandt 22
Emery, S. A. 61
Ergle, David R. 8
Ericson, E. E. 37, 72, 107
Ferger, Wirth F. 25, 107
Fleming, George H., Jr. 18
Foerster, Norman 47
Ford, Edwina 22
Foster, Sarah L. 22
Frazer, K. C. 55
Fussler, Karl H. 64, 107
Garrett, Mitchell B. 52, 56
George, W. C. 6, 97
Giduz, Hugo 107, 108, 109
Gilreath, E. S. 14
Glenn, W. D., Jr. 69
Green, Fletcher M. 52, 57, 90
Griffin, M. H. 19
Grissom, Mary A. 90
Groves, E. R. 81, 82, 83, 84, 86, 90, 107

PAGE
Grubbs, W. M. 55
Hamill, Ruth 67
Hamilton, J. G. deR. 54, 55
Hampton, Lelia 44
Harland, J. P. 20
Harper, Frances 52
Harrer, G. A. 19, 20, 21
Harshman, H. V. 14
Haynes, Laurine 22
Heath, M. S. 25
Heer, Clarence 81, 91
Henderson, Archibald 59, 97
Herring, Harriet L. 91, 92
Hetland, Melvin A. 64
Hickerson, T. F. 34, 35
Hight, Margaret 53
Hill, Mary J. 45
Hillhouse, A. M. 26
Hobbs, S. H., Jr. 79
Holland, W. T. 50
Hollowell, Minnie 56
Holmes, U. T., Jr. 72, 76, 77, 78, 99
Holroyd, G. C. 17
Huse, H. R. 72
Hon, Ralph C. 25
Howe, George 19, 21, 22, 98
Howell, A. C. 37, 46, 98, 107, 109
Howell, Frank S. 75
Howell, James 45
Hudson, Arthur P. 37, 99, 107
Hudson, Homer C. 31
Huffman, E. E. 18
Hughes, A. E. 11, 15
Hunter, Louise 22
Jacobs, M. L. 60
Jenkins, E. B. 21
Jenkins, Sadie F. 45
Jenkins, W. S. 59
Jocher, Katherine 81, 92
Johnson, G. G. 90, 93
Johnson, Guy B. 90, 92
Jones, Howard M. 37, 45, 48
Jordan, A. M. 27, 28
Joyner, J. B. 19
King, T. L. 8, 10
Knight, E. W. 29, 31, 33
Koch, Frederick H. 107
Koehl, G. 64
Lang, John A. 57
Lasley, J. W., Jr. 59, 108
Lawrence, G. H. 82
Lear, J. E. 35
Leavitt, Sturgis E. 71, 76, 98
LeConte, J. N. 10
Lindquist, Ruth 82
Linker, R. W. 108
Ljung, H. A. 13, 97

PAGE
Love, Virginia M. 31
Lyons, J. C. 72, 73, 74, 108
McCall, Fred B. 58
MacCarthy, Gerald P. 50
McConnell, J. P. 83
McCormick, C. T. 58
McCracken, Duane 23
McDowell, David F. 73
McFadden, J. H. 69
McHale, Cecil J. 108
MacKay, Eunice S. 46
McKee, W. J. 28
MacKinney, L. C. 52
McLeod, J. A. 46
MacLachlan, J. M. 93
McLellan, C. R. 9
McMillan, J. B. 47
MacMillan, W. D., III 37, 48
MacNider, W. deB. 60
McPherson, D. A. 14
Maddry, C. A. 61
Martin, D. F., Jr. 26
Martin, Virginia 22
Matthews, A. C. 7
Mattox, W. J. 9
Mebane, W. M. 12
Metzenthin, E. C. 51
Meyer, H. D. 82, 108
Mitchell, Adolphus 35
Mitchell, G. S. 90
Morse, W. C. 49
Mosher, E. R. 29, 30, 31, 32
Moss, B. T. 21
Mulkey, H. B. 65
Mumford, Dorothy 47
Munch, H. F. 28
Munch, R. H. 15
Murchison, C. T. 23, 26
Neal, Dorothy P. 76
Neal, Charles 76
Nims, F. B. 22
Noble, M. C. S. 27
Odum, H. W. 81, 85, 91, 92, 108
Paine, G. L. 44, 46
Parker, J. A. 32
Patrick, J. R. 70
Peacock, E. E. 24
Pearson, Ruth H. 77
Perkins, E. M. 58
Phillips, Lessie B. 22
Pierson, W. W., Jr. 52, 53, 55, 56, 108
Pittana, J. B. 35
Plessow, Gustav 99
Plyler, E. K. 65
Powell, Mabel A. 22
Preston, C. E. 109
Prouty, W. F. 49

PAGE
Puckett, W. O. 89
Raper, A. F. 84
Richmond, T. W. 11
Robson, C. B. 53
Roome, Elizabeth 32
Russell, H. K. 40
Sanders, J. P. 13
Sanders, W. B. 82
Saville, Thorndike 34
Schutz, A. H. 72
Schwenning, G. T. 23, 24, 109
Searles, Colbert 108
Seiwell, H. R. 88
Selden, Samuel 109
Sellman, H. H. 109
Shearin, P. E. 65
Sherard, Catherine 33
Shore, E. B. 33
Simkins, F. B. 108
Simpson, H. H. 33
Sledd, A. P. 10
Smith, E. R. 22
Smith, Mary P. 85
Smith, Minnie J. 22
Smith, S. D. 54
Smith, W. F. 16, 17
Spruill, C. P., Jr. 25
Spruill, Julia C. 94
Staab, H. H. 109
Stabler, J. C. 53
Stainback, R. F. 36
Stevens, Elizabeth P. 9
Stevens, Stanley S. 86
Stevenson, Hazel A. 41
Stiles, J. K. 53
Stockton, Carrie M. 77
Stoudemire, S. A. 73
Stroup, Thomas B. 39, 109
Stuhlman, Otto, Jr. 62, 63, 64, 65
Taylor, Cecil G. 77
Taylor, George C. 36, 41, 42, 43, 44, 45
Taylor, George F. 56
Taylor, Malcolm D. 24
Thomas, H. C. 15
Thrall, W. F. 47
Totten, H. R. 6, 109
Trabue, M. R. 30, 32
Turner, J. O. 18
Turner, Lucile 47
Uzzle, A. B., Jr. 34
Valentine, J. M. 88, 97
Vance, R. B. 86, 93
Vandiver, E. P., Jr. 42
Van Hecke, M. T. 58, 109
Vest, Lucile 78
Vilbrandt, F. C. 18, 19
Wager, Paul W. 80

PAGE
Walker, N. W. 30, 33
Wallace, R. M. 48
Way, Evelyn L. 22
Webster, Maude 15
Wells, M. P. 48
Wertz, Lily M. 22
Wheeler, A. S. 8, 9
Whitaker, M. D. 62
White, A. M. 18
White, Elizabeth 22
Williams, H. H. 60, 61
Williams, L. L. 89
Williams, W. W. 16
Wilson, H. V. 87, 88, 89
Wilson, Louis R. 109
Wilson, Thomas J., III 75
Wolf, H. D. 59
Wolfe, M. 12
Wood, Harriette 86
Woodhouse, E. J. 87, 94
Woofter, T. J., Jr. 90
Wright, L. B. 38, 39
Wright, Thomas E. 73
Yarborough, Gustie 57
Young, Ina V. 87, 94
Zimmermann, Erich W. 23, 26
zurBurg, Henry 62, 65